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U56w  
1885

THE WORLD'S  
INDUSTRIAL & COTTON  
CENTENNIAL EXPOSITION  
NEW ORLEANS, LA.  
1884 & 1885.

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MEDICAL DEPARTMENT,  
UNITED STATES ARMY.

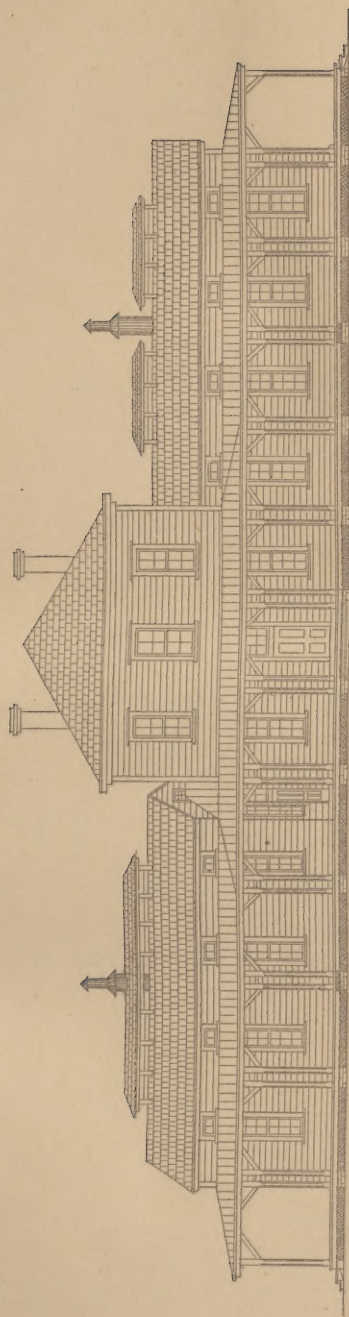


JOHN SHAW BILLINGS  
COLLECTION









Front Elevation.

DRAWING OF THE MODEL OF THE REGULATION U. S. A. POST HOSPITAL OF 24 BEDS.

PLATE A

JSB

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1885

C.2

The World's Industrial and Cotton Centennial Exposition,

NEW ORLEANS, LA., 1884-85.

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Medical Department, United States Army

EXHIBIT-CLASS 1.

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No. 1.

DESCRIPTION.

OF THE

MODELS OF HOSPITALS

AND

HOSPITAL TENTS.

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HENRY McELDERRY,

*Assistant Surgeon, U. S. A.*

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT U. S. A.

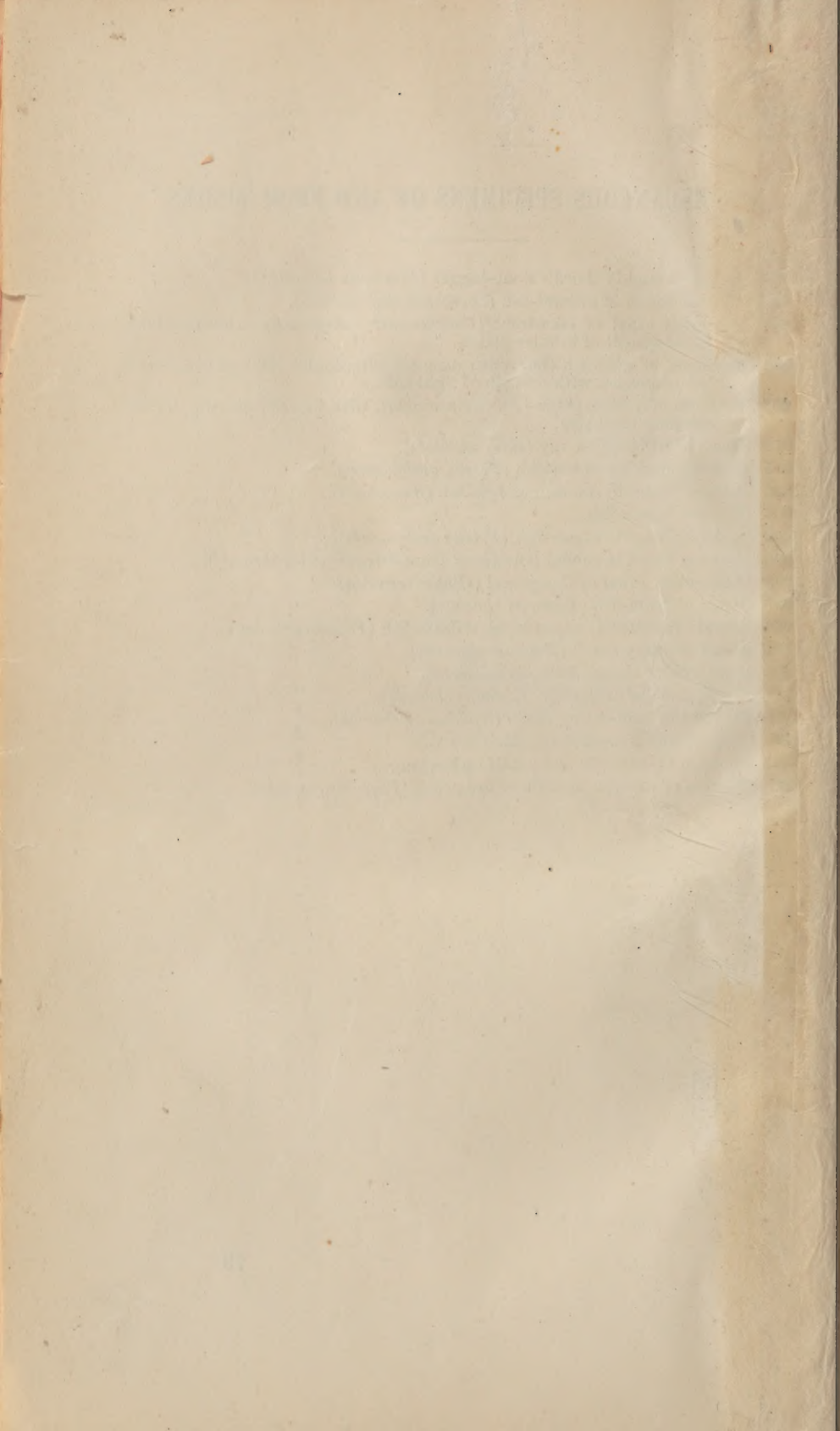
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New Orleans, La., 1884-85.



# MISCELLANEOUS SPECIMENS OF AND FROM FISHES.

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- No.
- 104 Entozoa found in Baird's stone-tugger (*Fundulus bairdii*).
- 132 Entozoa found in gizzard-fish (*Coregonus clupeiformis*).
- 145 Intestinal canal of lake-trout (*Chritivomer namaycush*), exhibiting large development of tubular glands.
- 630 Specimen of gold-fish (*Carassius auratus*) with double tail and one sternal rib connected with first rib of right side.
- 863 Cranium of yellow perch (*Perca americana*), with superior maxilla in rudimentary condition.
- 875 Heart of whip-tailed ray (*Raia undulata*).
- 1015 Superior maxilla of saw-fish (*Pristis antiquorum*).
- 1035 Entozoa found in stomach of Jew-fish (*Stereolepis*).
- 1036 Entozoa from a fish.
- 1063 Superior maxilla of saw-fish (*Pristis antiquorum*).
- 1099 Entozoa found in caudal muscles of drum-fish (*Pogonias chromis*).
- 1093 Alimentary canal of Conger eel (*Conger oceanica*).
- 1097 Heart of drum-fish (*Pogonias chromis*).
- 1098 Cœcal (vermiform) appendages of drum-fish (*Pogonias chromis*).
- 1173 Heart of dusky shark (*Eulamia obscurus*).
- 1269 Jaws of blue shark (*Eulamia milbertii*).
- 1732 Palate bone of drum-fish (*Pogonias chromis*).
- 2191 Maxillæ of man-eating shark (*Squalus carcharias*).
- 2236 Eggs of sharp-nosed skate (*Raia lævis*).
- 2382 Embryo of shark six and a half inches long.
- 2447 Portion of superior maxilla of drum-fish (*Pogonias chromis*).



# The World's Industrial and Cotton Centennial Exposition.

NEW ORLEANS, LA., 1884-'85.

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## Medical Department, United States Army

EXHIBIT-CLASS 1.

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### DESCRIPTION OF THE MODELS OF HOSPITALS AND HOSPITAL TEXTS.

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#### MODEL OF THE REGULATION U. S. A. POST HOSPITAL OF 24 BEDS.

This model was constructed by Mr. Charles Seltman, of Washington, D. C., on a scale of half an inch to the foot, for the World's Industrial and Cotton Centennial Exposition, New Orleans, Louisiana, 1884-'85. It is, including the base, 7 ft. 2" long by 4 ft. 5" wide, and has been built in exact accordance with the plans and specifications contained in Circular No. 10, War Department, Surgeon General's Office, October 20, 1877, (rendered authoritative by General Orders No. 98, Headquarters of the Army, Adjutant General's Office, Washington, October 20, 1877), from which the following description has been taken :

#### 1.—APPROVED PLAN FOR A REGULATION POST HOSPITAL FOR 24 BEDS.

"This hospital consists of a central administration building and two wards arranged as wings.

"The wing for each ward will be 45 feet 8 inches long by 25 feet 4 inches wide and 15 feet high in the clear from floor to ceiling. For

very cold climates the height may be reduced to 12 feet, in which case the length will be increased to 50 feet.

"Attached to each ward, and at the outer end and behind, will be a room for earth closets, as shown in the plans.

"The administration building will be 36 feet by 4 inches front, by 40 feet 4 inches deep, and two stories high, with a back building 43 feet 8 inches by 15 feet 4 inches. Each story of this building will be 13 feet high from floor to ceiling.

"A veranda 10 feet wide will surround the hospital, as shown in plans.

"In hot climates the wards will be detached from main building, remaining connected with it by the veranda only, which will thus entirely surround the ward. (The ward on the left hand side of model has been so detached. See drawing, Plate A). The back building will be separated in like manner.

"The plan of the first floor, the designations and dimensions of rooms, and the positions of doors, chimneys, windows, and beds are shown on Plate B, the plan and dimensions of the second floor on Plate C. (For front elevation of building see Plate A.) All of the exterior walls will be rough boarded, with inch boarding, well nailed, on which will be laid a covering of tar paper or felt. A cistern out of 1½ inch dressed stuff, dovetailed and strongly put together with lead, will be put over ceiling, when directed, 5 by 5 by 2 feet deep, supplied by a pump in sunk cistern through a 1½ inch pipe. The roofs of verandas will be trimmed with best roofing tin. A 20 by 8 inch galvanized iron ventilating pipe, for ventilation of ward, running between joists, opening under floor of veranda, having 2 regulating registers at ends of pipe. On the centre of this pipe, on the upper surface, should be an opening 20 inches square corresponding with a similar opening in the floor of the ward, over which a jacketed stove may be placed.

"In all cases the ground floor must be raised at least 18 inches from the ground. On the Gulf coast and in Arizona the wards will not be ceiled and will have ridge ventilation their whole length. (The left hand ward in the model has been thus constructed).

"At all posts where continuous artificial heat is required for three months in the year, the wards will be ceiled and have boxed openings carried from the centre of the ceiling to the ridge for summer ventilation. There will be two of these openings, each 10 feet long by 2½ feet wide, and 10 feet apart, each fitted below with lattice work and above with movable shutters. (The right hand ward in the model has been so

# APPROVED PLAN

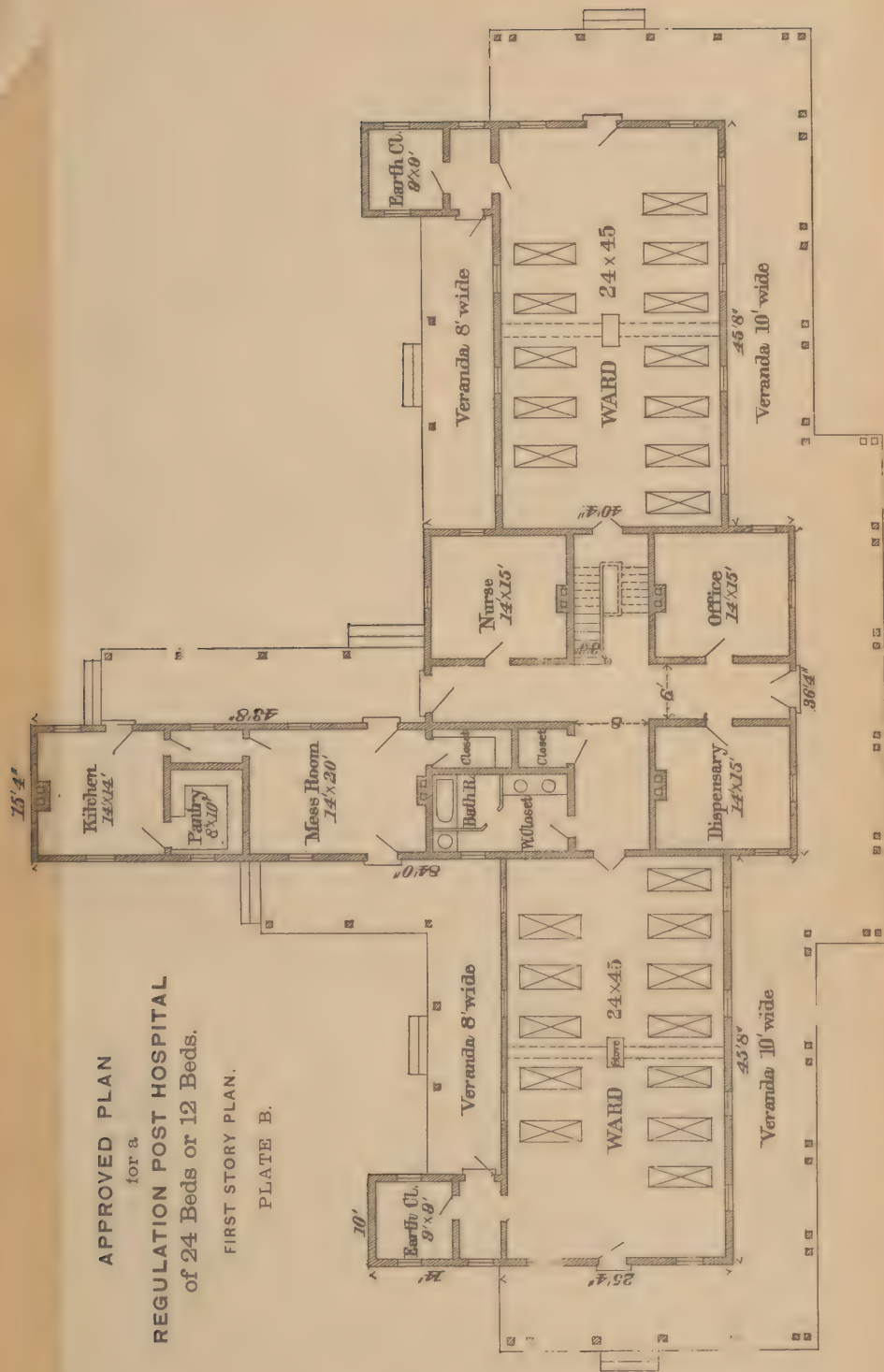
for a

## REGULATION POST HOSPITAL

of 24 Beds or 12 Beds.

FIRST STORY PLAN.

PLATE B.





constructed). A ventilating shaft 6 inches square will be placed in each earth-closet room, and the lamp or gas burner of this room should be directly beneath this shaft."

### THE HOSPITAL TENTS.

The field hospitals of the moving armies during the war of 1861-'5 were usually constructed of hospital tents. In the most general arrangement, three hospital tents pitched end to end constituted the unit, by the repetition of which these hospitals were extended to the necessary capacity. Hospital tents were also largely used to provide additional accommodations in connection with the great general hospitals. In this case four hospital tents pitched end to end very often constituted the unit, and a wooden floor was frequently provided. The hospital tents thus used were of the regulation pattern used by the Medical Department in time of peace, and were each 15 feet by 14. Three of them have been pitched end to end in the manner used during the war, and furnished with bedsteads, bedding, etc.

### HOLABIRD'S TENTS.

The three tents pitched, each by itself, are samples of the tent invented and patented July 22, 1884, by Brig. Gen'l S. B. Holabird, Quartermaster General, U. S. Army, viz:

1 Hospital Tent; 1 Conical Wall Tent; 1 Improved Common Tent.

The points claimed by the inventor and which he desires to secure by letters patent, are:

"1. A tent having its lower portion divided into several portions adapted to be separately lifted and folded.

"2. A tent having a main body and a number of supplemental pieces secured to said body and detachably fastened to each other.

"3. A tent having a main body, a number of supplemental pieces secured to said body and detachably fastened to each other, and fastening devices for retaining the supplemental pieces in a raised position.

"4. A tent having its lower portion divided into several portions, one portion being provided with looped cords and the adjacent portion with eyelets.

"5. The method of fastening the several portions of the tent together and to the ground, which consists in passing the loops of the one part

through the eyelets of the other part and then through the loop next above, and in addition passing the lowest loop over a tent-pin."

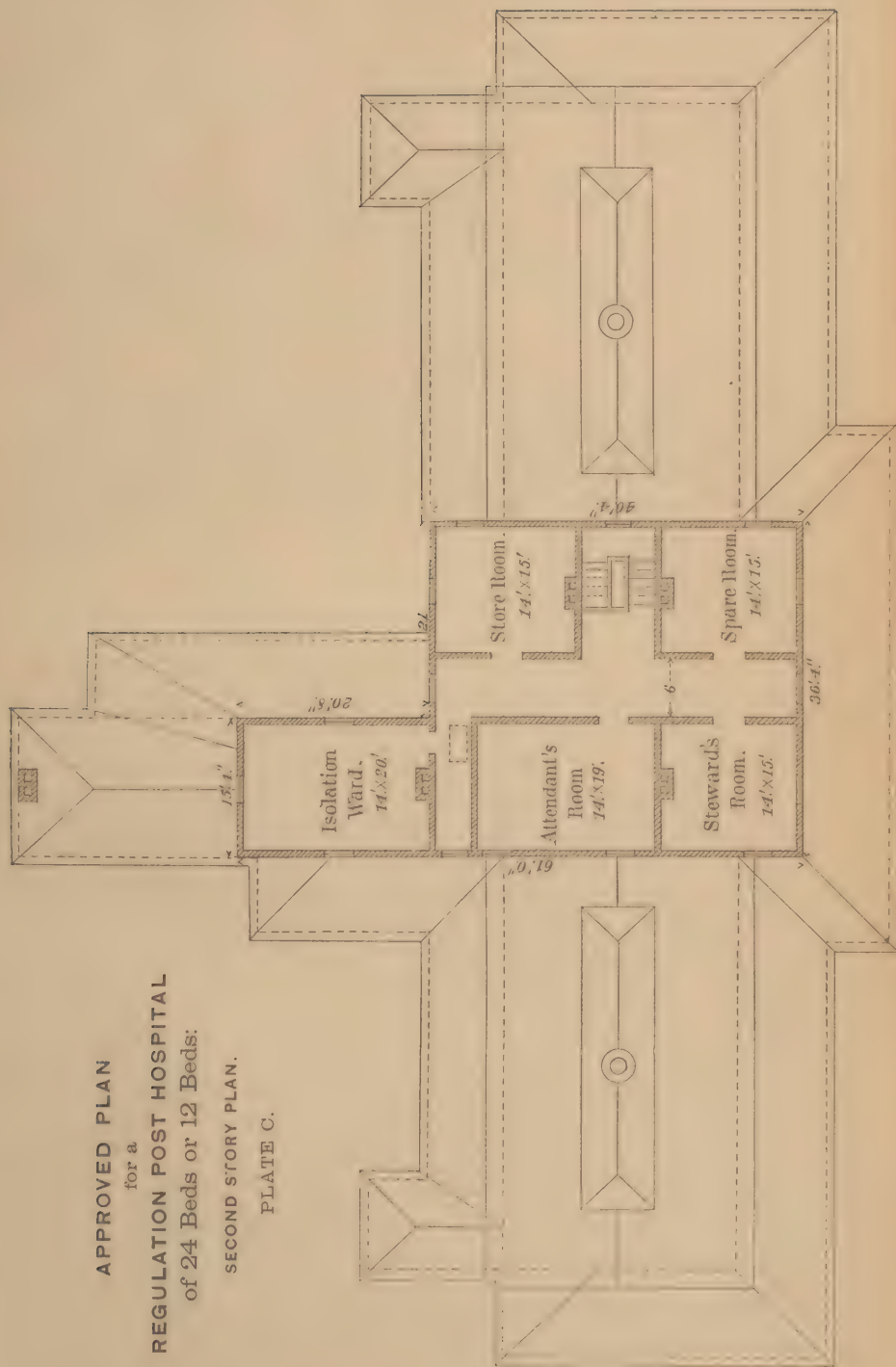
#### THE BARRACK HOSPITALS OF THE WAR OF 1861-'5.

These are represented by five models from the Army Medical Museum, viz., a model of the barrack ward which served as the unit, by the repetition of which to the necessary extent the "General Hospitals" were formed; and four models representing four of these general hospitals, viz: The Lincoln, Hicks, McClellan, and Mower Hospitals. The following descriptions of these models were compiled by the late Surgeon J. J. Woodward, U. S. Army.

APPROVED PLAN  
for a  
REGULATION POST HOSPITAL  
of 24 Beds or 12 Beds:

SECOND STORY PLAN.

PLATE C.





### 1.—MODEL OF A BARRACK WARD.

This model was constructed by Mr. Charles Seltman, of Washington, D. C., and being on the scale of half-an-inch to the foot, is 7 ft. 9½ inches long. All details of framing and construction are faithfully represented, except that the roof is hinged, so as to be lifted for the inspection of the interior.

The form of ward represented is that which was finally adopted by the War Department in the summer of 1864, as set forth in the following order, which is given in full because it describes not merely the barrack ward, but also the general plan of hospital construction, particular instances of which are illustrated by the four models described below:

WAR DEPARTMENT, July 20, 1864.

The following instructions are promulgated for the information of officers charged with the construction of general hospitals, and will be deviated from only in cases of imperative necessity: Buildings will not be taken or occupied for hospital purposes until after full examination and approval by a medical inspector, or other officer of the Medical Corps detailed for this purpose; and all alterations will be made in accordance with plans submitted by him and approved by the Surgeon-General.

E. M. STANTON,  
*Secretary of War.*

*Site.*—The site of the hospital should be a well-drained plain, with a subsoil of gravel, and sufficiently extensive to accommodate the buildings. The situation should be elevated, as remote as possible from marshes or other sources of malarial, and must have a convenient supply of pure water.

*Plan.*—General hospitals will be constructed on the principle of detached pavilions, each ward being in a separate building, with beds for sixty patients. Besides the wards, there will be detached buildings for each of the following purposes: General Administration Building, Dining-room and Kitchen for Patients, Dining-room and Kitchen for Officers, Laundry, Commissary and Quartermaster's Store-house, Knapsack-house, Guard-house, Dead-house, Quarters for Female Nurses, Chapel, Operating-room, and Stable. The wards, administration building, kitchens, dining-rooms, and chapel are to be connected by covered walks, which will have floors, but no sides.

No general plan for the arrangement of the buildings can be directed, as the varying character and dimensions of sites render an uniform adherence to any one impracticable. Wards may be arranged "en echelon" in two converging lines, forming a V—in this case, the administration building should be at the apex of the V, the other buildings between the wings; or as radii from the periphery of a circle, ellipse, or rounded oblong—in this case, the administration building should be one of the radii, the other buildings within the enclosure; or parallel to each other—in this case, the administration building should be in the centre of the row, the other buildings in the rear. Other plans may be rendered necessary by the special features of the ground. In any case, the important points to be observed are, to place the buildings far enough apart, (at least thirty feet should intervene between two parallel buildings,) and to locate them in such a manner that no one shall interfere with the ventilation of another. It is preferable to locate the wards so that the long diameter may run north and south, or nearly so.

Fig. 3



PLAN OF WARD

Fig. 4



SIDE ELEVATION

Each ward will be a ridge-ventilated pavilion 187 by 24 feet. At each extremity, two small rooms 9 by 11 feet, one on each side of a passage, 6 feet wide, will be partitioned off. The space remaining for patients will be 165 by 24 feet, see Figure 3, A, which gives the location of the beds and position of the doors and windows. The small rooms are occupied as follows: Figure 3, *a*, chief nurse; *b*, closet for medicines, etc.; *c*, bath-room; *d*, closet for close stools. Figure 4 is the side elevation.

The wards will be 14 feet high from floor to eaves—the pitch of the roof to vary in accordance to the materials composing it. The floor to be elevated at least 18 inches from the soil, with free ventilation beneath it. A ward thus constructed will accommodate 60 patients, allowing more than 1,000 cubic feet of air-space to each. The number of wards will be regulated by the number of patients the hospital is intended to accommodate. A hospital of 1200 beds will require 20 wards.

*Administration Building.*—For a hospital of 600 to 1200 beds, this will be a ridge-ventilated building, 38 by 132 feet, and two stories high; the first 14 and the second 12 feet high in the clear. This building contains the general office, office of surgeon in charge, linen and store rooms, dispensary, chaplain's office, lodging-rooms for officers, etc.

*Dining-Room and Kitchen for Patients.*—The dining-room will be a ridge-ventilated building, large enough to seat a number equal to two-thirds the number of beds. The most convenient form is a long parallelogram, into which the kitchen opens in the centre of the long side. The kitchen will be divided into two unequal parts—the larger for the preparation of ordinary diet, the smaller for the extra diet—the cooking in both to be done on ranges. Where there is an engine, steam may be advantageously used for boiling.

*Dining-Room and Kitchen for Officers.*—A small building for this purpose will be situated near the administration building.

*Laundry.*—A building two stories high, with lodging for the laundresses on the second floor. The roof should be flat, with posts for stretching clothes-lines.

*Commissary and Quartermaster Store-Room.*—A small two-story building, furnished with boxes and shelves for the various parts of the ration—having an ice-house connected with it for the preservation of meats and other perishable articles, and a room for clothing. The second story to contain lodging-rooms for the cooks.

*Knapsack-House.*—A building to receive the effects of the patients while in hospital. It will contain as many pigeon-holes, each 2 feet square, as there are beds in the hospital.

*Guard-House.*—A detached building to lodge the guard, with a guard-room for prisoners.

*Dead-House.*—A small building containing two apartments, located so as not to be observed from the wards, and lighted by sky-lights.

*Quarters for Female Nurses.*—A detached building containing lodging-rooms, dining-room, and kitchen for the female nurses.

*Chapel.*—A detached building, fitted for the purpose of religious services, so arranged as to be used also as a library and reading-room.

*Operating-Rooms.* Two rooms, each 15 feet square; one well lighted by sky-lights, the other by windows. The first for surgical operations, the second for discharge-boards, etc. It should be situated near the administration building.

*Stable.*—For ambulance and officers' horses.

*Water Supply.*—Where practicable, a large tank will be erected and kept supplied from wells or springs by pumps worked by a steam-engine. The engine, if possible, will be situated near the kitchen and laundry, in which case the steam may be made serviceable in cooking, and the power may be employed in working the washing and mangling machines.

*Sinks.*—Where the supply of water is adequate, water-closets may be constructed in one of the small rooms in each ward; but where this is not the case, privies will be built at a convenient distance from the wards, furnished with water-tight boxes, which must be emptied every night.

*Ventilation.*—During warm and mild weather the wards will be ventilated by the ridge (Figs. 5 and 6,) but during winter the ridge will be closed, (Fig. 7,) and ventilation by shafts substituted. Four stoves will be allowed to a ward, each partly surrounded by a jacket of zinc or sheet-iron, with an air-box opening beneath it to

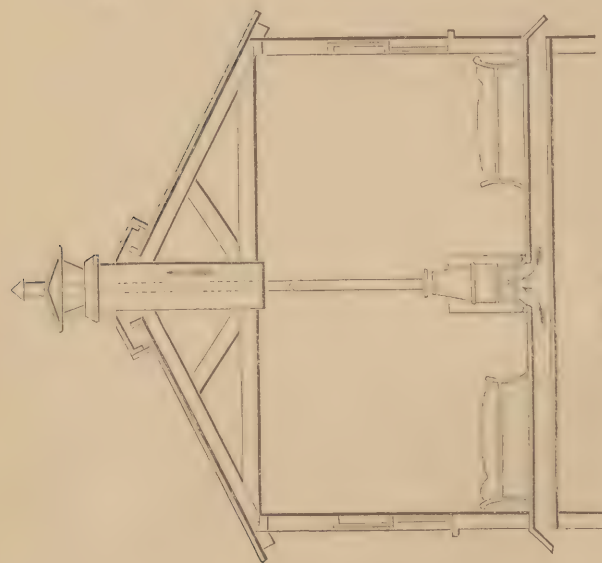


FIG. 5.

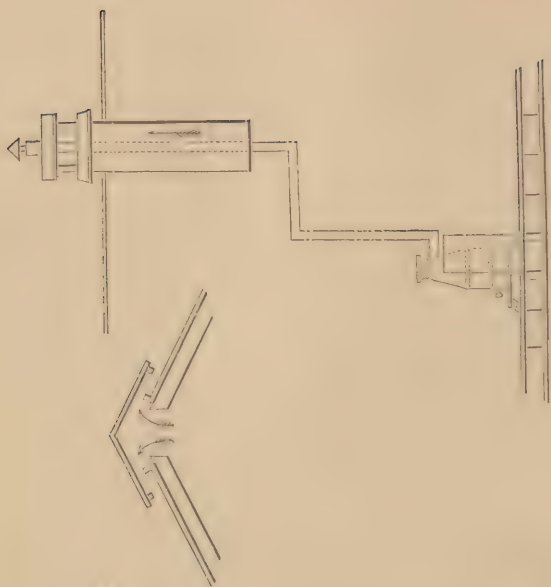


FIG. 6.

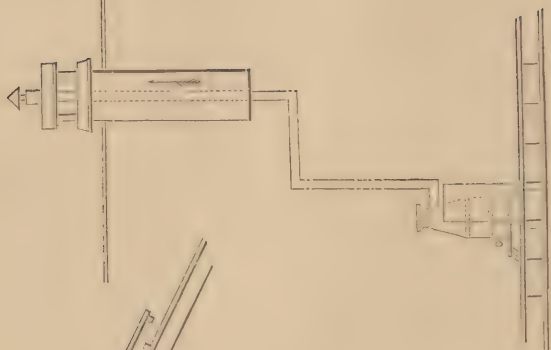


FIG. 7.

furnish the supply of fresh air. At 8 feet from the stove will be a shaft, properly capped, through which the stove-pipe will ascend. Figure 8 gives a section and Figure 9 a side view of the arrangement. The shaft should be 18 inches square, and should not come below the tie-beams.

## 2.—MODEL OF THE LINCOLN HOSPITAL, WASHINGTON, D. C.

This is a block model, on the scale of 30 feet to the inch, and represents the arrangements of the wards and other buildings of this hospital, of which the following description was furnished by Surgeon J. C. McKee, U. S. A., who was for a long time in charge:

Lincoln Hospital, Washington, D. C., is located about a mile east of the Capitol building. Its site is a gently-undulating, uncultivated plain, without shade-trees. East and south of the hospital, the plain declines towards the Eastern Branch of the Potomac, which is about half a mile distant. The soil is a light sandy loam, resting on a deep stratum of gravel. The hospital covers an area of thirty acres of ground, and consists of twenty detached pavilion wards, arranged "en echelon" in the shape of the letter V, the apex of which looks westwardly. The administration building is at the apex of the V. The buildings for kitchen, dining-rooms, etc., are in the space between the two sides of the letter. The whole is surrounded by a picket-fence, five feet high, between which and the wards is a wide road for ambulances. (See Figure 8.)

The *Wards* are pavilion barracks, built of rough boards, white-washed, with roofs of boards covered with tarred paper; they are 20 in number, 10 on each wing. Each ward is 187 feet by 24, 16 feet to the eaves and 20 to the ridge, at which there is the usual ridge-ventilation the whole length of the ward. They are plastered on the inside for about 8 feet above the floor. At the west end of each are 4 rooms, occupying 15 feet in length. These are used for clothing, baths, nurses, and sinks. Each ward contains 34 windows and 4 doors, one at each end and two in the middle, opposite each other. Four ventilating gratings, at regular distances in the floor of the ward, communicate by wooden flues under the floor with the air outside, thus giving a full supply of fresh air whenever the weather requires the doors and windows to be closed. With 62 patients, there are 72 square feet of floor and 1447 cubic feet of air-space for each. Thirty-one beds are arranged on each side, with a chair and bed-side table between each pair. An avenue of 11 feet is left between the two rows of beds. The wards are lighted at night by kerosene lamps, and heated by stoves in winter. On the inner side of the two wings of the hospital, and running the whole length of each, is a raised covered walk or corridor, on which is laid a railway track 2 feet wide and 2456 feet long. Box-cars convey the food from the main and extra kitchens to each ward.

The *Administration building*, at the apex of the triangle, is 184 by 38 feet, 22 feet to the ridge and 16 to the eaves. A hall, 8 feet wide, runs the entire length of the first floor. On the left side of the hall are the following rooms: office of surgeon in charge, 14 by 14; office of military assistant, 11 by 14, (employs two clerks;) principal office, 56 by 14, (employs fourteen clerks;) printing-office, 19 by 14, (employs two men;) quartermaster's store-room for clothing, etc., 44 by 14, (employs two clerks;) wardmaster's room, 13½ by 14; bath-room, 4¾ by 14; post-office, 7 by 14, (employs a postmaster and assistant.) On the other side of the hall, and on the right of the entrance door, are the office of the officer of the day, 15 by 14; office of the officer of the guard, 11 by 14, (four clerks;) office of surgical records, 11 by 14, (one clerk;) private office of surgeon in charge, 12½ by 14; office of medical inspector, 11 by 14; linen-room, 66 by 14; all washed clothing and bed-linen is sent from the laundry to this room, and thence distributed to the different wardmasters; one clerk and four women are employed here, the latter in mending, etc. The medical store-room, 11 by 14, adjoins the dispensary, and is used for storing supplies. The dispensary, 25 by 14, usually employs four men: the medicines for the whole hospital are compounded here, under the charge of a hospital steward. Lastly, the laboratory,

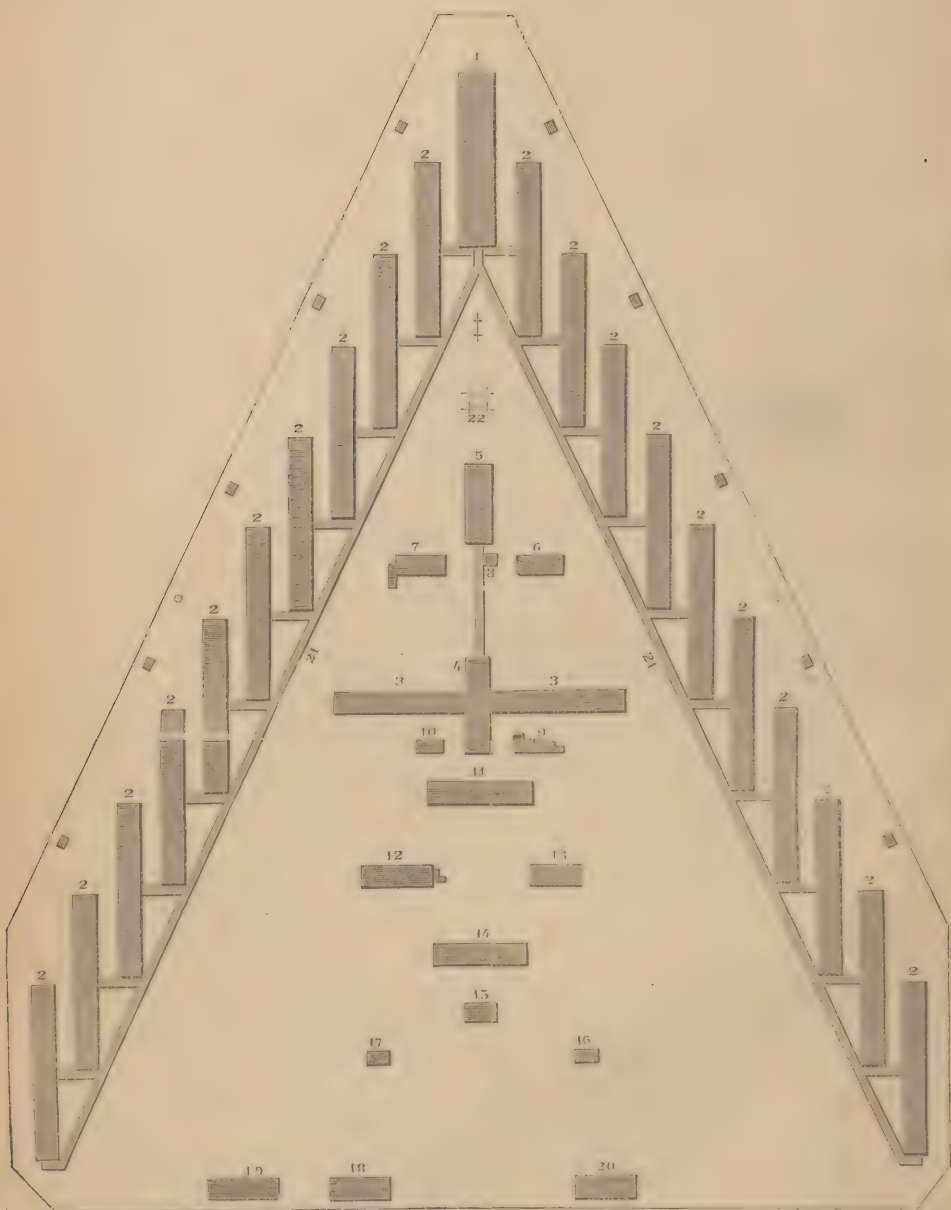


FIG. 8.—GROUND PLAN OF LINCOLN GENERAL HOSPITAL, WASHINGTON, D. C. Scale, 200 feet to the inch. 1, Administration building. 2 2 2 2, Wards. 3 3, Dining-rooms. 4, Kitchen. 5, Laundry. 6, Stewart's quarters. 7, Sisters' quarters. 8, Engine-house. 9, Meat house. 10, Coal-house. 11, Commissary building. 12, Sutler. 13, Chapel. 14, Stable. 15, Freedmen's quarters. 16, Guard-house. 17, Dead-house. 18, Barracks for guard. 19, 20, Officers' quarters. 21, Covered way. 22, Tank.

which adjoins the dispensary, is 22 by 14 feet, used for preparing tinctures, ointments, plasters, etc.

On the second floor of the administration building is the knapsack-room, 111 by 37 feet. The effects, accoutrements, etc., of the patients coming into the hospital are deposited in this room for safe keeping. It employs two men, who receive the articles deposited, issue tickets for the same, credit them to depositors, and deliver them when the patients leave. There are 2184 boxes, arranged in parallel rows, reaching from the floor to the ceiling. Adjoining the knapsack-room is the extra-duty men's room, 50 by 37 feet, used as a sleeping-room by the men employed on extra duty, and a clerks' room, 25 by 23 feet, used by the clerks of the principal office for the same purpose.

Within the triangle formed by the two wings, and east of the administration building, is the *Tank*, resting upon a platform 25 feet high, and holding 12,000 gallons of water. It is supplied from a well under the engine-room, and the water forced into it by the engine, which drives the machinery of the laundry. This tank supplies each ward with water by means of pipes. There are four other wells in the enclosure, used for drinking and culinary purposes.

Twenty yards east of the tank is the *Laundry*, 61 by 24 feet. The building runs east and west, is two stories high, and has a platform for drying clothes on the roof. Seven men and twelve women are employed in its various departments. The washing is done by steam-power, as is also the drying and ironing. The average wash is 5000 pieces daily—has been pushed to 7000. On the first floor of the laundry is the washing apparatus, consisting of a mangle, steam-boiler, revolving drum for wringing, rinsing-boxes, roller and ironing table: on the second floor is the steam drying-room, 36 by 12½ feet. This is in addition to the drying arrangements on the roof. Separated by a partition from the laundry, on the first floor, is a sleeping-room for women, 22 by 24 feet; a kitchen for the same, 9½ by 17; a dining-room, 9½ by 18. The engine is in a building adjoining the laundry on the east: it is of six-horse power, and employs one engineer and an assistant. It supplies power for the tank as well as for the laundry. The well which supplies the tank is 40 feet deep, with usually 4 feet of water; its diameter is 6 feet. The steam pump can raise 2000 gallons of water per hour.

The building for *Sisters' Quarters* is 23 by 51 feet, with a wing 16 by 28, forming a letter "L." It is divided into chapel, sitting-room, kitchen, etc. Twenty-eight Sisters of Charity were on duty, and I must bear evidence to their efficiency and superiority as nurses. The extra-diet kitchen is under the care of a sister, and one is detailed by the superior for each ward. They administer medicine, diet, and stimulants, are under the orders of the ward surgeon, and are responsible to him alone. They have been beloved and respected by the men.

The *Stewards' Quarters* are 18 feet north of the engine-room, are two stories high—contain dining-room, kitchen, sleeping-rooms, etc. Five stewards generally occupied this building.

The *Operating-room* is 25 feet east of the engine-room. It is 17 feet square, and lighted by a skylight on the north side of the roof. A revolving-table is in the centre of the room; also a cupboard for instruments, sponges, microscope, etc., with a sink in the northwest corner. The Examining-room adjoining it is 17 feet 7 inches square, and communicates by a door with the operating-room.

The *Extra-Diet Kitchen* is under the same roof with the general kitchen. It is 18 by 24 feet—has in it a Harrison's European range, 8 feet front, 3 feet 6 inches deep. A recess 18 by 12 feet adjoins on the south. This kitchen is under the supervision of a sister, who is generally assisted by from four to six men.

The *Main Kitchen* is 77 by 24 feet. It contains a cooking-range, 28 feet 10 inches long and 3 feet 2 inches wide; also three of "Peters' and Johnson's" bake-ovens or roasters, two boilers for tea and coffee, each with a capacity of 120 gallons, five boilers or caddrons for soup or hash, (60 gallons each,) and two for heating water, (one 60 gallons, the other 22 gallons.) Full diet is prepared here for all the men in the hospital.

On either side of the kitchen, opening from it north and south, are the *Dining-rooms*, each 116 by 24 feet, with three tables running the whole length of each, capable of seating in all 860 men. At the distal end of each room a door opens on a corridor and raised walk, so that the patients are protected from the weather in

coming to their meals. Cars, with cans fitted in them, are run around the corridors to the several wards with the food for those unable to come to the dining-room.

On the northwest corner of the kitchen is a room 30 feet long, 14 feet wide, and 10 feet high, used for washing dishes, roasting coffee, etc. From 40 to 50 men are usually employed in the various departments of the kitchen.

Opposite the centre of the northern dining-room and distant to the west 30 feet is the *Fire-Engine and Hose-House*, 26 by 20 feet—contains one fire-engine, three hose-carriages, carrying 1850 feet of hose, 34 ladders, 22 hooks, 278 axes, and 300 buckets.

Thirteen feet south of the kitchen is the *Meat-shop*, 14½ by 23. In its centre is an ice-box, 3½ by 11½, and 4 feet deep, lined with zinc. The allowance of ice per day is one pound for each man.

East of the kitchen, and connected by a covered way, is the *Commissary Building*, which is two stories high: the upper story is used to lodge attendants; the lower story, used for commissary store-room, is 82 by 23½, and is under a commissary steward. In the northeastern corner is the liquor-room, 8½ by 13, heavily planked and secured against marauders. All liquor is issued here on the orders of the ward surgeons. The vegetable room is in the northwestern corner, and is 9 by 13½. An office, 9 by 15½, adjoins the liquor-room. The books and accounts are kept in this office. The store-room is provided with a counter 52½ feet long, and gives employment to one steward, one clerk, and two men. At the southern end is the bread-room, 14½ by 23, which employs two men cutting bread for the tables. Adjoining, on the east, is the bakery, 14 by 23½. The oven is 10 by 16 feet.

The *Chapel* is situated 63 feet east of the commissary building. It is a structure shaped like the letter "T," one story in height, with a cupola on top. The main building is 24 by 78 feet. The northern end is used during the week as a reading-room. The left wing, 18 by 26 feet, is used as a library: it contains 3,000 volumes, contributed to the hospital from various sources. The right wing is the same size, and is used as a school for the freedmen employed in the hospital, who are instructed by two female teachers.

Twenty-four feet south of the chapel is the *Sutler's Store*, 24 by 68. The *Stables*, 25 by 101, are 72 feet east of the sutler's shop: they contain 18 horses, 3 wagons, 3 ambulances, 3 carts, and 1 night-cart. Thirteen men are employed as hostlers, drivers, etc. One hundred and twenty-one feet northeast of the stables is the *Guard-House*, 15 by 47 and one story high. South of this are the *Oil-Room* and *Freedmen's Quarters*, 29 by 69 feet. The oil and lamp room is in the northern part. Kerosene oil was used in lighting the whole hospital, and all the lamps were filled and trimmed in this room. A corporal and two men were employed. Ninety-one feet southeast of the oil-room is the *Dead-House*, 15 by 40 feet. It is divided into two rooms—the northern one used in making post-mortem examinations, and the southern for plaster-casts, etc. Thirty-two feet south of this room is the *Photographic Gallery*, 16 by 24 feet. An operator is employed at \$100 per month, paid from the slush fund. Surgical cases, pathological specimens, etc., are taken; also likenesses of all men discharged on surgeon's certificate of disability, as a guard against fraud. On the base line of the triangle are the *Medical Officers' Quarters*, 63 by 24 and two stories in height; also, in the same line, the quarters for the *Veteran Reserve Corps*, a building two stories high, with an outside entrance-stairway to the second floor. Ninety feet further back, 100 hospital tents are pitched, placed four end to end, on substantial frames, with floors raised from the ground and a door at each end of the frame. The sides of these tents were always easily raised, and gave the best of ventilation; hence I selected some of them as gangrene-wards, and, I think, with the very best results. In winter, each ward was heated by two stoves, with pipes running to a shaft in the centre. Each ward of four tents contained 20 beds. The length of the fence around the hospital is 1458 yards. The distance of the fence from the tents at the base of the triangle is 124 feet. Sinks were arranged around the whole line of fence. They had movable boxes, which were regularly emptied and lined. Policing was done by a gang of about 20 freedmen. The hospital could accommodate 1240 patients in the 20 barrack wards. Its total capacity in January, 1865, was 2575 beds, including those in tents and the branch barracks, a short distance off.



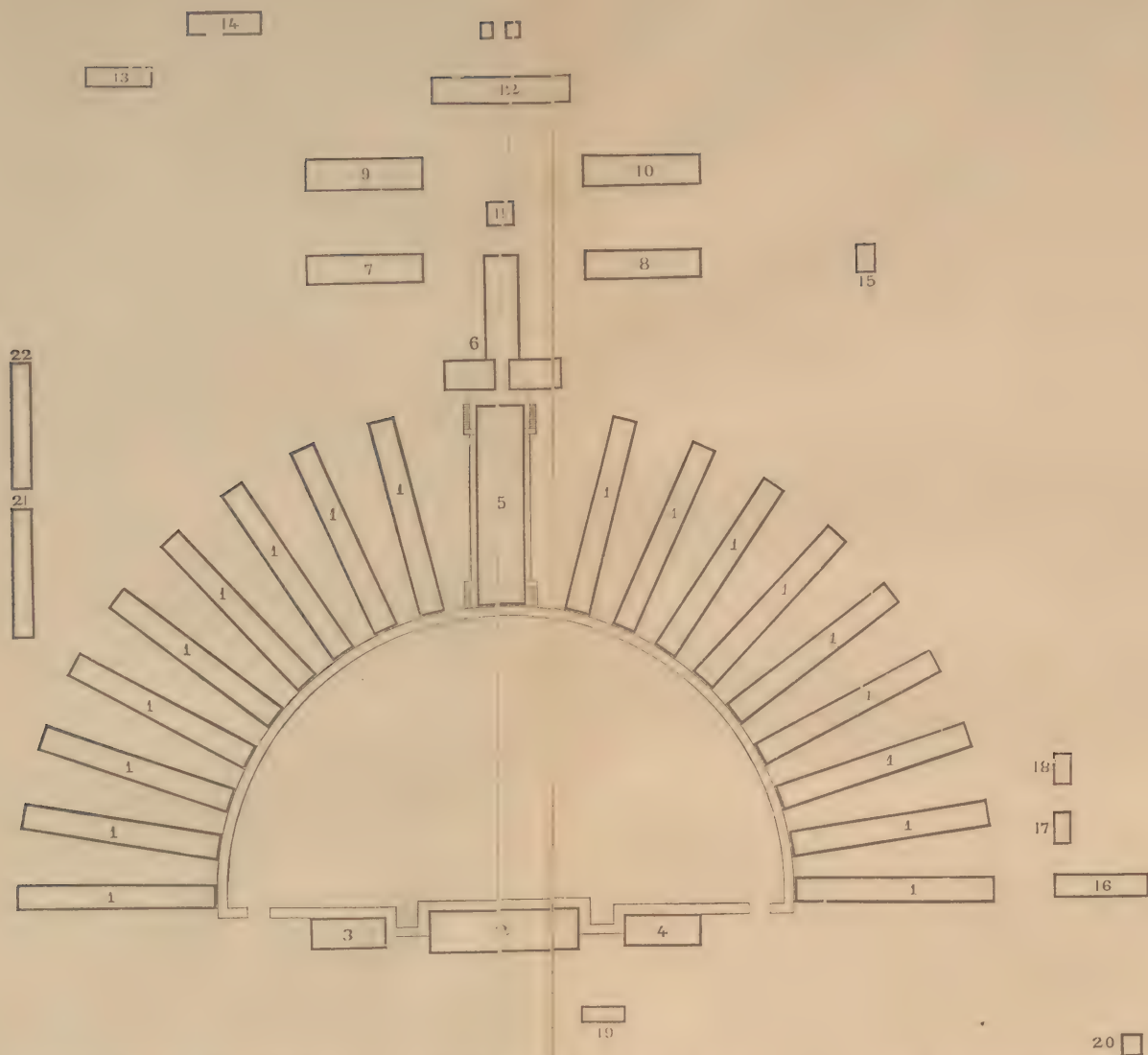
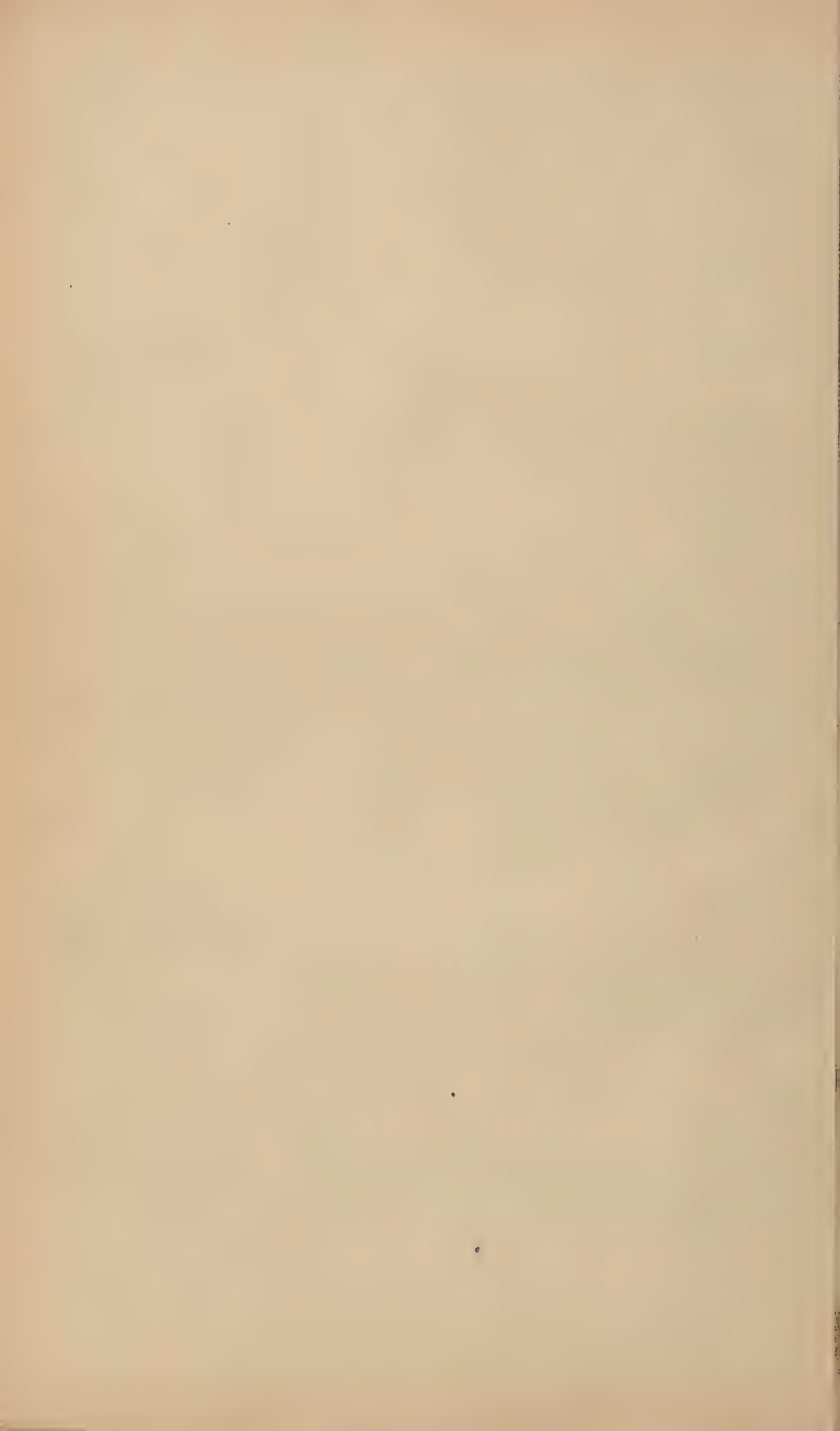


FIG. 9.—GROUND PLAN OF HICKS' GENERAL HOSPITAL, BALTIMORE, MD. Scale, 180 feet to the inch. 1 1 1 1. Wards. 2. Administration building. 3. Linen-room, etc. 4. Dispensary and operating-room. 5. Dining-hall. 6. Kitchen and laundry. 7. Ward for detailed men. 8. Knapsack-room. 9. Commissary store-house. 10. Quartermaster's store-house. 11. Tank. 12. Quarters for guard. 13. Stable. 14. Wagon-house. 15. Sutler. 16. Steward's quarters. 17, 18. Officers' houses (of which, also, there are several not in the figure.) 19. Guard-room. 20. Guard-house, near entrance gate. 21. Work-shop. 22. Contagion ward; this is farther distant than is represented in the figure. The wards, dining-room, and administration building are connected by a covered way, which is indicated by faint lines in the plan.



This hospital was opened December 23, 1862, and closed August 22, 1865. During this period the movements of patients were as follows:

	ADMITTED.			Returned from furlough and desertion.	AGGREGATE.	RESULTS.						
	Sick.	Wounded.	TOTAL.			Returned to duty and mustered out.	Sent to general hospital.	Furloughed.	Transferred to Veteran Reserve Corps.	Discharged.	Deserted.	Died.
White troops.....	12391	7837	20228	3565	23793	7191	9411	4400	392	1053	286	1060
Colored troops.....	13	5	18		18		18					
Prisoners of War...	174	959	1133		1133		924			45	3	161
Total.....	12578	8801	21379	3565	24944	7191	10353	4400	392	1098	289	1221

Deducting those sent to general hospital as cases not terminated, and considering that furloughed and deserted amounted to 4686, while only 3565 of these are reported as returned from furlough and desertion, we shall have the following statistics for the *terminated cases of white troops treated*:

Total to be accounted for, excluding those sent to other hospitals, 10,817; of whom 6339 were returned to duty, 852 mustered out of service at the close of the war, 1121 lost by desertion and failure to return from furlough, 1053 discharged for disability, 392 transferred to Veteran Reserve Corps, and 1060 died.

### 3.—MODEL OF THE HICKS' HOSPITAL, BALTIMORE, MD.

This is a block model on the scale of 30 feet to the inch. The following description of the hospital is taken from circular No. 6, Surgeon-General's Office, Nov. 1, 1865:

The Hicks' Hospital is situated on the continuation of Townsend street, in the western suburbs of Baltimore, near the city boundary. It was opened for the reception of patients June 9, 1865, and is therefore one of the most recently constructed hospitals. The plan was essentially the circular one referred to above, p. 9, but many important improvements and additions were devised by Surgeon Thomas Sim, U. S. Vols., under whose supervision the details of the plan were prepared. The original design contemplated a circular hospital, built on the War Department plan, with thirty-six radiating pavilion wards, each to accommodate 60 patients. The approach of the end of the war, however, prevented this from being executed, and the hospital, as completed, is a semi-circle, in which the wards radiate from a covered way. It is, however, both on account of the substantial character of the wooden buildings and the numerous conveniences which have been carefully supplied, one of the most complete of the hospitals built during the war. (See Fig. 9.)

The wards are built and ventilated as directed in the circular from the War Department. The administration building is 132 by 28 feet and two stories high: the first story contains offices for the surgeon in charge, executive officer, quartermaster, commissary, and their clerks; it also contains the hospital library and printing office. On the second floor are sleeping apartments for officers. This building is flanked on each end by a smaller one, 70 by 28 feet, one of which contains the linen-room and post-office, with the officers' dining-room, kitchen, and pantry. The other contains the dispensary, medical store-rooms, room of the discharge board, and an operating-room lighted by a skylight. The dining-room building is 187 by 48 feet,

and is two stories high. The dining-room, which is on the first floor, is capable of seating about 1,200 patients. The second floor, which is accessible by stairs on the outside, is occupied by the chapel and by dormitories for female nurses. At the end of the dining-room is a T-shaped building for kitchen and laundry. The general kitchen, extra-diet kitchen, and bakery occupy separate apartments; the former two each contains a suitable range and steam fixtures, the latter two bake-ovens. The laundry has a separate room for drying by steam, and immediately adjoins the engine-room, which is at the extremity of the building. There are, besides the foregoing, separate buildings for knapsack-room, quartermaster's store-house, commissary store-house, quarters for detailed men, barracks for guard, workshop, contagion ward, dead-house, stewards' quarters, and quarters for married officers. The buildings are plastered inside, are lighted by gas, to be warmed in the winter by stoves, and receive their water supply by pipes from the city water-works, besides which there is a tank for the purpose of keeping a stock of water constantly on hand in case of fire. For the purpose of extinguishing fire, there is abundant hose to fit the steam-pump. There are also water-buckets, axes, etc. At the distal end of each ward is a lavatory and bath-room and a water-closet. Each bath-room has in it a small stove, on which is a boiler for the supply of hot water. In the water-closets the excretions are received in troughs, into which a stream of water runs, and which are emptied by withdrawing a plug several times daily. They discharge into sewers constructed for the purpose, which carry all offensive matters entirely away from the hospital.

This hospital was opened for patients June 9, 1865: and closed March 31, 1866. The total number of white soldiers received up to this date was 1275, of whom 1011 were sick and 264 wounded. Of these, 404 were transferred to other general hospitals. The number of terminated cases, therefore, was 871, who are thus accounted for:

Total to be accounted for, excluding those transferred to other hospitals, 871; of whom 184 were returned to duty, 417 mustered out of service at the close of the war, 69 lost by desertion and failure to return from furlough, 119 discharged for disability, 2 transferred to Veteran Reserve Corps, and 50 died.

Besides the above, 290 colored soldiers were admitted, of whom 19 died.

#### 4.—MODEL OF THE McCLELLAN HOSPITAL, PHILADELPHIA, PA.

This is a block-model, on a scale of 30 feet to the inch. It was constructed, as was the model of the Mower Hospital, described below, by Mr. John McArthur, of Philadelphia, the architect by whom the plans for the construction of these hospitals were prepared. The following description is condensed from an inspection report by Medical Inspector John L. Le Conte, U. S. A.:

The McClellan Hospital is located on a portion of the old Logan estate, named Stenton, situated on the Germantown turnpike, within four miles of Philadelphia.

The ground upon which the hospital stands is a plateau, which slopes gently and regularly to Wingahocking creek.

This small creek has a succession of little falls and ripples, which, within the distance of half a mile, makes a descent of twenty-five feet or more. This creek provides one of the great requirements of a hospital—admirable drainage.

The hospital buildings were turned over to the Government on February 9, 1863. They are constructed entirely of wood, boarded outside and inside, the joints on the outside being battened. (See Fig. 10.)

The plan of the hospital is as follows: 18 wards radiate from a corridor 15 feet wide, arranged in the form of a parallelogram, with rounded extremities. In this corridor rails are placed, on which food-cars carry meals from the general kitchen to the doors of the wards. The wards are each 175 feet long, 20 feet wide, and 13 feet high to the eaves, with a pitch of 5 feet from the apex of the roof. Each ward contains 61 beds: 60 in the ward proper, and 1 in the ward-master's room. 5 beds out of the 61 are intended to be occupied by the nurses and attendants, thus leaving 56 beds for patients in each ward. It may be stated, however, that most of the nurse



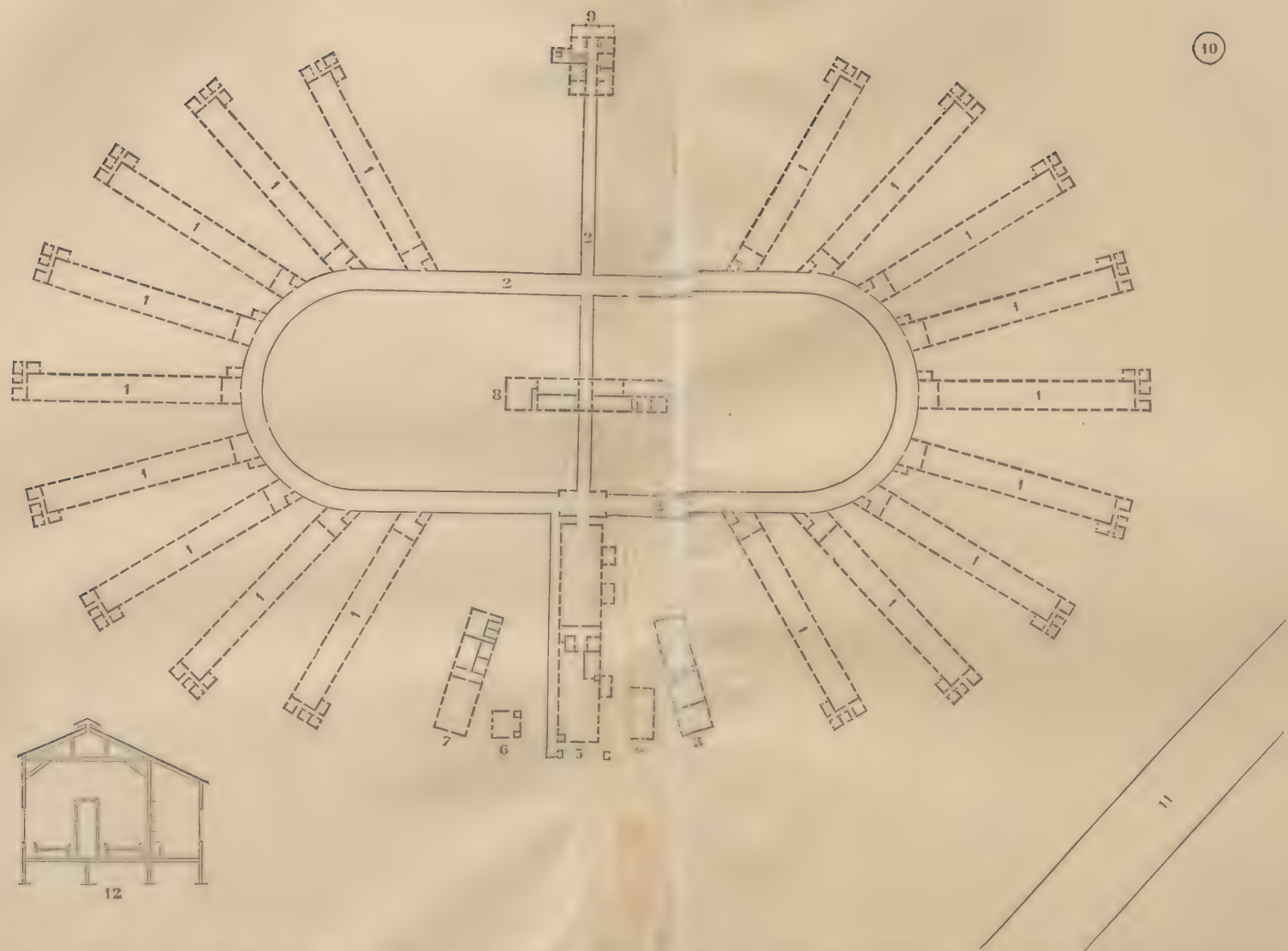


FIG.—10. GROUND PLAN OF MCCLELLAN HOSPITAL, PHILADELPHIA, PA. Scale, 195 feet to the inch. 1 1 1 Wards. 2 2 Corridors. 3. Quartermaster's building. 4. Engine-house. 5. Kitchen building. 6. Stable. 7. Commissary building. 8. Administration building. 9. Officers' quarters. 10. Cess-pool. 11. Germantown avenue. 12 Section through end of ward.

- 3

duty, &c., is performed by convalescents, who are really patients in the hospital. The greatest capacity of the hospital proper is 1098 beds. The present capacity of the hospital, however, is much greater, 200 beds having been placed in the corridors, and 900 in hospital tents pitched in the hospital grounds, thus making the total number of beds upwards of 2000. Each ward has a *dining-room* and *pantry* at its inner extremity next the corridor, and a *ward-master's room*, *lucatory*, *water-closet*, and *bath-room* at its outer extremity.

In addition to these, small galleries have been put up in the outer extremities of the wards, covering the entries, &c., for the purpose of stowing away articles that might otherwise cumber the wards. In the ward-master's room are closets for placing the ward clothing, and in the extremity of the entry dividing the above little offices, large dressed boxes have been constructed for receiving soiled clothing. Dressing closets, boxes, and cupboards have been added from time to time to facilitate the working of the wards and provide every convenience for the inmates. Each ward is, in fact, a complete hospital within itself, except kitchen and dispensary.

The *Commissary building* is situated on the western front of the hospital. It is 111 feet long, 24 feet wide, and 25 feet high. It contains in the lower story two store-rooms, an ice-house and meat-room, cellar for keeping ale, porter, and milk, offices for the commissary steward, mess-room for the hospital stewards, and paint shop. On the second floor it contains 2 knapsack-rooms, an office, bath-room, and dormitory.

The *Quartermaster's building* is situated on the western front of the hospital. It is 111 feet long, 24 feet wide, and 25 feet high, and contains 2 store-rooms well provided with shelving, an office, dormitory, and green-room on the first floor; on the second floor, a store-room, guard-barracks, and prison room.

The *Engine-house* is one story high, and is situated on the western front of the hospital, between the Quartermaster's building and laundry. It is 40 feet long, 19 feet wide, and 17 feet high. There is a small additional building attached to it, used as coal-bins, with a capacity of 20 tons. Fourteen feet of the main building is partitioned off for engineers' quarters, leaving the boiler-room 26 by 19 feet. There is a bench with vice attached, and all the necessary tools for making repairs. There are 2 tubular boilers, locomotive pattern, 10 feet long, with 38 two-inch tubes. The draft is through underground flues leading to the smoke-stack; the stack is 45 feet high. The boilers are 10-horse power each, and supply the steam for bathing, cooking, and washing purposes, and for running 2 steam pumps, 1 of 5-horse power, used in case of fire; the other, a 10-horse power pump, for supplying the building with water from the wells.

The *Kitchen building* is situated at the middle of the western front of the hospital. It is 172 feet long, 30 feet wide, and 28½ feet high, and is composed of 2 stories. The *Laundry* is situated at its western extremity. The cooking-room is 90 feet long; a small store-room is attached to it, and it is well provided with sinks, hot and cold water, cupboards, closets, &c. The arrangements are ample and convenient for the original capacity of the hospital, but the tent-wards have special cooking arrangements. The cooking in the general kitchen is done by means of 2 large ranges, 2 cooking-stoves, and 2 double-jacketed steam-boilers.

The laundry is 74 feet long. It is well furnished, and the washing accommodations are ample, there being 24 stationary wash-tubs, each having 2 faucets, 1 for cold water, the other for the steam with which it is heated. There are 2 large steam-boilers for boiling clothes and making soap. The laundry contains also an office for the superintendent, a drying-room, ironing-room, and the room for dirty clothing; above the laundry, in the second story, is the linen-room. The whole laundry is divided from the kitchen by a 6-foot entry. Five thousand pieces of clothing per week have been washed in the laundry, with an average of 25 washing women.

It may be added, however, that a considerable amount of clothing has now to be issued to lunatics outside of the hospital. Over the kitchen and laundry are dormitories for the employés of those departments.

The *stable* is also situated at the western front of the hospital, between the laundry and commissary building. It is convenient and comfortable, having stalls for four horses, carriage house, and mow above capable of holding 10,000 lbs. of straw.

The *Printing office* and *Paint shop* are on the first floor of the commissary building; the former is furnished with a small press, with chase 9 by 11 inches. It is well supplied with type and all printing appliances. All the printing of the hospital

is done here. The paint shop is a small room next the printing office. It is well supplied with painting materials.

A small building has been constructed north of the commissary building, to be used as a *Carpenters' shop*. All the necessary repairs for the hospital are prepared here.

The *Officers' quarters* are situated at the eastern front of the hospital, and are well located, convenient, and pleasant. The building is 2 stories in height, with 7 chambers, kitchen, bath-room, and water-closet on the first floor, and 7 chambers, bath-room, and water-closet on the second.

The *Dormitories for Cooks and Matrons* are situated over the kitchen and laundry. The guard are quartered in hospital tents.

The *Administration building* is situated in the middle of the centre oval, and is connected with the main corridor and officers' quarters by a transverse corridor running at right angles to the long diameter of the oval. In it are situated most of the offices of the hospital, viz: The offices of the surgeon in charge, executive officer, assistant executive officer, military assistant, general office for clerks, reception room for officer of the day, officers' mess-room, dispensary, and store-room. The offices are all small; but being centrally situated, are very convenient to all parts of the hospital.

The dispensary is well arranged and ample.

The *Knapsack-room* is on the second floor of the commissary building. It is provided with boxes for every bed, and is conveniently arranged. Each ward has rental checks, with the number of the ward and number of the bed stamped upon them. When patients are received these checks are placed upon their baggage, and it is then stored away in the appropriate boxes.

The *water* of the hospital is supplied by the Germantown water-works. The water bills are all estimated on the basis of 30 gallons per diem for each inmate of the hospital. Wells are now being dug, which it is supposed will supply all the water needed. Two of the wells are already constructed, and about 8,000 gallons per day are pumped from them. The water from the wells is of very good quality.

The water is distributed through the hospital by means of galvanized-iron pipes, and in case of accident or fire two main reserve tanks, with a capacity of 30,000 gallons, are kept filled to supply deficiencies.

Over the northern and southern portions of the corridor are placed 2 large tanks, with a capacity of 3800 gallons each, the water in which is heated by steam; these supply the hot-water for bathing, pantry, and other purposes.

A similar tank of the same size, heated by steam, is placed over the kitchen, to supply it with hot-water.

The *drainage* of the hospital is arranged as follows: One line of 12-inch tile pipe surrounds the whole of the hospital buildings, just outside of the line of the fence, with 4-inch pipes leading into the same from the lavatories, bath-rooms, and water-closets of each ward. Another line of 12-inch pipe surrounds the inner oval at the margin of the corridor, with 4-inch pipes leading into it from the kitchen sink, laundry, wash-tubs, and water-closets. Both 12-inch mains connect on the southeastern portion of the hospital, and empty into a cess-pool about 150 yards in the rear. The cess-pool is 20 feet in diameter. The overflow from it is led by means of a drainage tile into the Wingahocking creek. The solid materials are cleared out from time to time as the pool becomes filled.

*Ventilation, Heating, &c.*—Each building is furnished with ridge ventilation, and in the wards there are also floor ventilators between the windows, capable of being closed by sliding frames. The openings are flush with the floor and 8 inches square; there are 27 to each ward. The openings in the ridge are covered by falling shutters, which are elevated and lowered by pulleys.

The hospital is heated by 256 stoves; these are watched at night during the cold season by an organized fire-guard, the same guard doing duty in the wards and corridors as watchers during the warm weather.

The hospital is lighted by gas from the Germantown gas-works.

The *water-closets* are 9 feet 5 inches long by 6 feet wide. The apparatus consists of a cast-iron sink 9 feet long and 12 inches wide, covered by a board pierced with 5 holes; a faucet supplies the water, and a trap removes it whenever it becomes necessary.

Each ward has also a cast-iron drip or sink for washing dishes and other work.



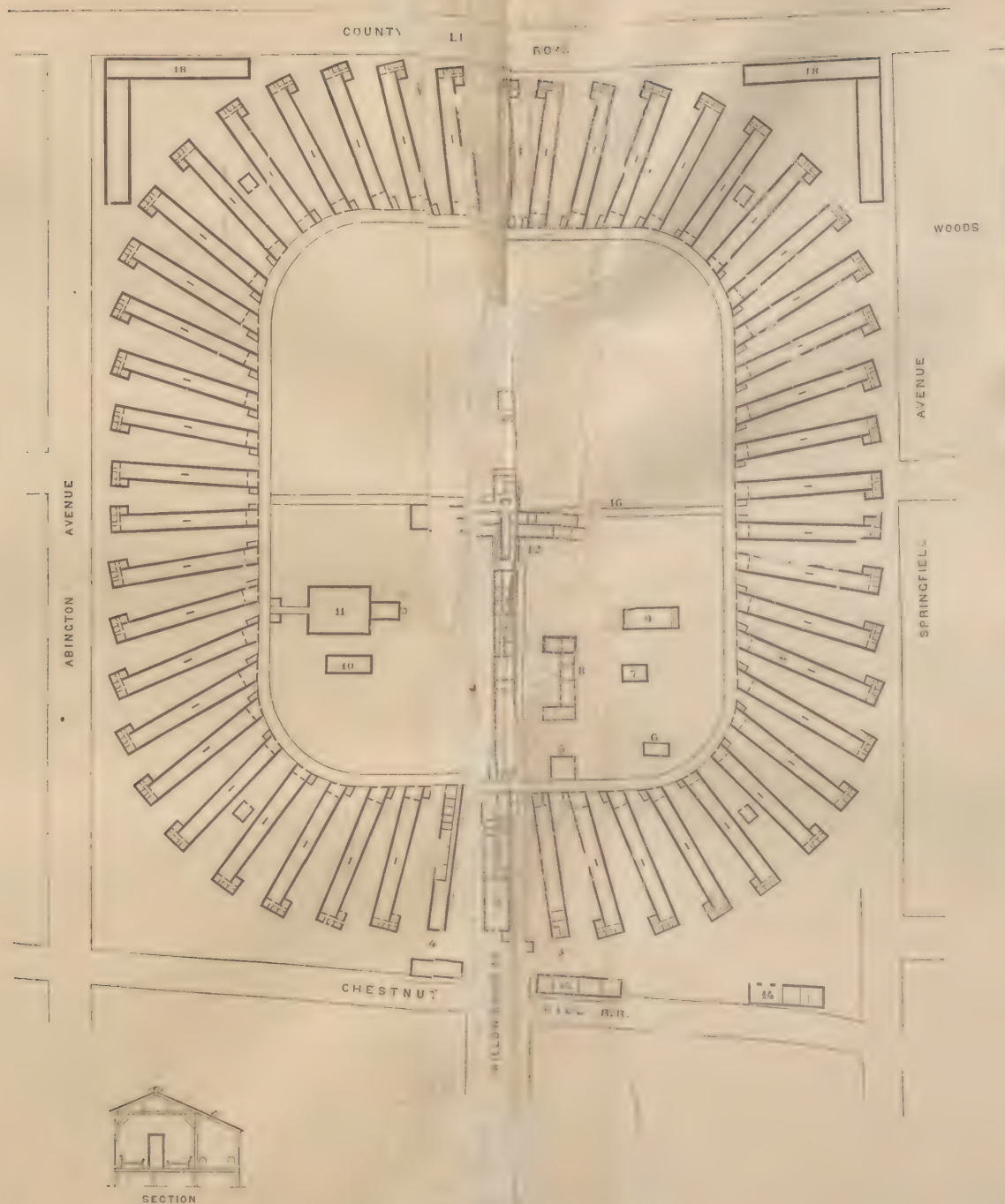


FIG. 11.—GROUND PLAN OF MOWER HOSPITAL, PHILADELPHIA, PA. 8  
 &c. In the building between this and 12 is the kitchen, &c.  
 ing-room. 6. Butcher's shop. 7. Guard-house. 8. Boilers,  
 tion building. 13. Ice-house. 14, 15. Railroad Depots. 16,  
 rooms, &c.

c. 195 feet to the inch. 1 1 1 1. Wards. 2. Reception-room, laundry,  
 Knapsack-room, band quarters, &c. 4. Store-rooms, &c. 5. Operat-  
 ing-room, &c. 9. Sut. er. 10. Carpenter's shop. 11. Chapel. 12. Administra-  
 tion. Corridors. 18 18. L-shaped buildings used as barracks, store-



The *apparatus for subduing fire* consists of 2000 feet of 2½-inch india-rubber hose, with couplings complete, 8 fire-plugs, and one 5-horse power force pump.

Two large reserve tanks, holding 30,000 gallons of water, are placed over the main corridor, on brick walls, for the purpose of furnishing an extra amount of water should the supply from the main be insufficient.

In addition to the above, each ward has a 20-foot section of inch hose, with couplings and branch pipe, that can be attached in a moment to a small plug in the water-closet. Each ward has also in the dining-room a fire-axe, and three fire-buckets kept constantly filled. It has been stated before that an organized fire-guard patrols the hospital at night.

This hospital was opened March 12, 1863, and closed July 30, 1865. During this period the movements of patients were as follows:

	ADMITTED.			Returned from furlough and desertion.	AGGREGATE.	RESULTS.								
	Sick.	Wounded.	TOTAL.			Returned to duty.	Mustered out.	Sent to other general hospital.	Furloughed.	Transferred to Veteran Reserve Corps.	Discharged.	Deserted.	Died of disease.	Died of Wounds.
White troops. ....	102	1151	7513	1119	10632	1115	720	173	1122	111	698	691	71	36
Colored troops. ....	24	4	.....	.....	30	35	.....	1	.....	.....	.....	.....	.....	.....
Prisoners of War. ....	.....	25	.....	.....	25	2	.....	9	.....	.....	.....	.....	.....	8
Total.....	126	1179	7513	1119	10687	1152	720	174	1122	111	700	691	71	44

Deducting those sent to other hospitals as cases not terminated, and considering that the furloughed and deserted amounted to 3883, while only 3119 of these are reported as having returned, we shall have the following statistics for the *terminated cases of white troops treated*:

Total to be accounted for, excluding those sent to other hospitals, 5795; of whom 3295 were returned to duty, 720 were mustered out of service at the close of the war, 764 lost by failure to return from furlough and desertion, 698 discharged for disability, 111 transferred to the Veteran Reserve Corps, and 107 died.

##### 5.—MODEL OF THE MOWER HOSPITAL, PHILADELPHIA, PA.

This is a block-model on the scale of 30 feet to the inch. The following description is condensed from an inspection report by Medical Inspector John L. Le Conte, U. S. A.:

The Mower Hospital is situated on an elevated plateau in the village of Chestnut Hill, about 9 miles north of the city of Philadelphia. It is on the eastern side of the railroad, and trains from Philadelphia pass every two hours. The total capacity of the hospital is 3600 beds.

It is constructed of wood in the best manner, lined with smooth planks on the inside, and lathed and plastered on the outside. It consists of 50 *pavilions*, radiating from a corridor of a rectangular form, with rounded angles. The corridor is 16 feet wide and 2400 feet long, enclosing a space of 7 acres. The *Administration Building* is located in the centre of the enclosed space. This building is connected with the wards by a transverse corridor. (See Fig. 11.)

A third corridor connects the entrance to the hospital with the administration building, thus dividing the enclosure into three sections. Within the enclosure are the chapel and Bible-class room, laboratory, carpenter's shop, dining-room for attendants, boiler-room, general and extra-diet kitchen, butcher's-house, milk-house, operating-room, and dead-house, guard-house, and sutler's shop.

In the rear and on each side of the hospital are two buildings, each in the form of the letter L, and each connected with body of hospital by means of a corridor.

One-half of the one located on the northeastern extremity of hospital is used as a *barracks for convalescents*. The lower floor of the other half is occupied by the *Quartermaster's and Medical Purveyor's stores*, while the upper floor is used for offices and *quarters of officers of Veteran Reserve Corps*.

One-half of the other L-shaped building, which is situated in the northwestern extremity of hospital, is used as *barracks for the non-commissioned officers and privates of the Veteran Reserve Corps*, the other half as a dining-room for the occupants of both barracks.

Forty-seven of the pavilions are used as *wards* for patients. Each pavilion is 175 feet long, 20 feet wide, 13 feet high to the eaves, and 19 feet to the ridge. The *Dining-room* at the entrance to each ward is 10 by 20 feet; the *Scullery* adjoining, 8 by 10 feet. At the opposite end of building is a ward-master's room 10 by 12 feet, a *Wash-room* 8 by 10 feet, *Water-closet* 12 by 6 feet, and in an adjoining building, 10 by 12 feet, a *Bath-room*.

The ward proper is 150 by 20 feet. Each ward contains 61 beds. The offices are located in the *Administration building*, on the first floor. In addition to those belonging to the surgeon in charge, there is an executive office and an office for the transaction of the general business of the hospital.

Adjoining the general office is the *dispensary*, 14½ by 60 feet, with a *Store-room* in the rear 29 by 30 feet. Opposite the general office is the *Medical Officers' mess-room* 14 by 79 feet.

The second story is divided into 32 rooms, used as *quarters for Medical Officers*.

The *Operating-room* is in a separate building, 25 by 40 feet, situated to the right of the corridor connecting the entrance with the administration building. This building is divided into two rooms. The rear room is a lecture-room, containing seats for 100 persons, where all operations are performed. This room contains closets for instruments, dressings, &c., and the medical library and pathological cabinet of the hospital. The front room, 13 by 23 feet, is used as a *Dead-house*, and contains all the conveniences for post-mortem examinations, and a vault 8 feet long, 4 feet wide, and 12 feet deep, with windlass and dumb-waiter, for the reception of deceased soldiers preparatory to their burial.

Near the operating room is the *Guard-house*, which is strongly built, and contains a room 20 by 15 feet, for the guards, and six small cells for prisoners; it is also provided with a water-closet. Alongside of the guard-house is the *Sutler's shop*, 16 by 50 feet, connecting by a passage way with the main corridor.

The pavilion to the right of the entrance is divided into 3 rooms; the front and largest is used as a *Knapsack-room*; the two smaller ones are used by the band. The pavilion on the left of the entrance is two stories high. On the lower floor is the reception-room, mess-room for stewards, closets, &c., and the *Laundry*. The second story is used as a *Barracks for Attendants*. The pavilion next on the left of this is used for the commissary stores, bread-room, and quarters for stewards.

On the left of corridor connecting the entrance with the administration building is the *General Kitchen*, 30 by 110 feet. It contains three large-sized hotel ranges, and three London kitcheners, eight double-jacketed steam kettles for soup, and three large-sized cooking-stoves. At one end of the kitchen is the steward's room and pantry, and the other the surgeon's kitchen. In the rear of the general kitchen is the boiler-room, 29 by 29½ feet, containing two large boilers, a steam force-pump and fire-engine. On the left of the general kitchen is a large *Dining-room*, 150 by 20 feet, for attendants, the *Carpenter's shop*, 20 by 50 feet, and the *Chapel*, 60 by 75 feet, the latter connected with main corridor by means of a passage way. The chapel is used as a *Reading-room* by the patients during week-days, and contains a *Library* of 2400 books. In the rear of the chapel is a *Bible-class room*, 25 by 30 feet.

In the angle formed by the union of main corridor with corridor leading from chapel are the *Post-office* and *Barber shop*. To the right of the corridor connecting entrance with the administration building is the *extra-diet Kitchen*, 50 by 30 feet, containing one large London kitchener complete. The *Milk-house* and *Butcher shop* are also on the right of the corridor.

The *supply of water* is received from the Chestnut Hill water-works into four large tanks, in the second story of the administration building, capable of holding 18,000

gallons each, and into two large tanks at the junction of the transverse with the main corridor, which hold 15,000 gallons each.

The *saranga* consists of two large drains, one extending around the outside of the hospital, which is a brick culvert 20 by 30 inches in diameter, into which the water-closets, wash-rooms, and bath-rooms of the wards empty. The second runs outside of the corridor but within the enclosure, and is a drain of terra-cotta pipe 14 inches in diameter, which carries off the waste water from the sculleries of the wards. Emptying into this smaller drain are others leading from the different buildings of the hospital. Both these drains unite at the southeastern extremity of the hospital, forming one large sewer, which empties its liquid contents into a creek distant from hospital half-a-mile. The solid contents of sewer are removed once every four months.

The hospital is *ventilated* by the "ridge" method, and by square holes through the sides of the wards flush with the floor. It is heated by coal stoves, and lighted by gas.

The hospital is well supplied with all necessary *apparatus for subduing fire*. The enclosure is divided into four districts, and each district and ward is connected with the administration building by means of a telegraph. In case of fire, the alarm is sounded by pulling the wire in the corridor, the bell striking the number corresponding with the number of the district in which the fire exists.

There is one hose-carriage in each fire quarter, and each district is well supplied with hose, fire-buckets, fire-axes, and ladders. A well organized fire-brigade exists in the hospital, the members of which are drilled regularly three times a week.

The tanks inside of the corridor and outside within the enclosure are constantly kept filled with water.

This hospital was opened December 24, 1862, and closed November 14, 1865. During this period the movements of patients were as follows :

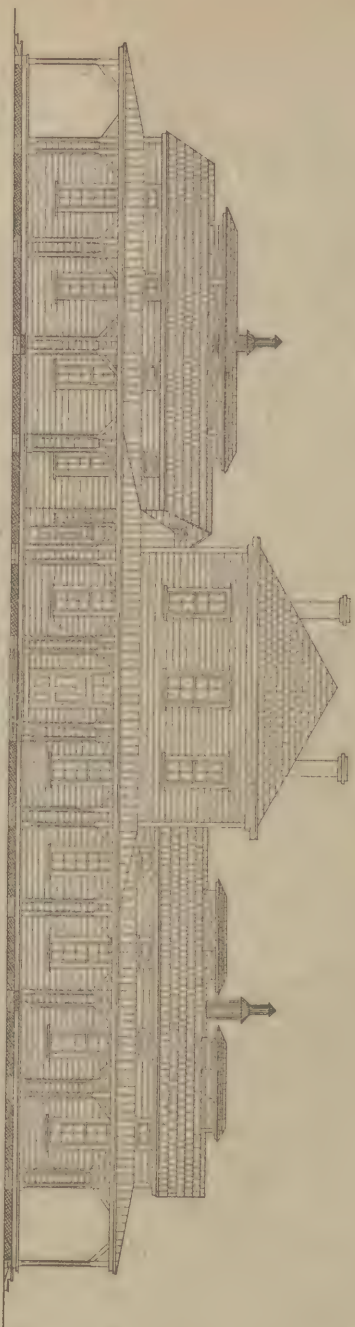
	ADMITTED.					RESULTS.							
	Sick.	Wounded.	TOTAL.	Returned from furlough and desertion.	AGGREGATE.	Returned to duty.	Mustered out.	Sent to other general hospital.	Furloughed.	Transferred to Veteran Reserve Corps.	Discharged.	Deserted.	Died of Disease.
White troops .....	11747	10017	21834	4457	26291	10106	1989	4876	4499	865	1937	1695	248
Colored troops .....	22	17	39	.....	39	2	1	10	.....	.....	17	.....	3
Total .....	11769	10034	21873	4457	26330	10108	1990	4886	4499	865	1954	1695	251

Subtracting those sent to other general hospitals as cases not terminated, and considering that the furloughed and deserted amounted to 6194, while only 4457 of these were reported as having returned, we shall have the following statistics for the *terminated cases of white troops treated* :

Total to be accounted for, excluding those sent to other hospitals, 16,956 ; of whom 10,106 were returned to duty, 1989 mustered out of service at the close of the war, 1737 lost by failure to return from furlough and desertion, 1937 discharged for disability, 865 transferred to the Veteran Reserve Corps, and 322 died.







Front Elevation.

DRAWING OF THE MODEL OF THE REGULATION U. S. A. POST HOSPITAL OF 24 BEDS.

PLATE A

The World's Industrial and Cotton Centennial Exposition,  
NEW ORLEANS, LA., 1884-'85.

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Medical Department, United States Army,

EXHIBIT-CLASS 3.

---

No. 2.

DESCRIPTION

OF THE

MODELS OF HOSPITAL STEAM-VESSELS

FROM THE U. S. ARMY MEDICAL MUSEUM,  
WASHINGTON, D. C.

BY THE LATE

SURGEON J. J. WOODWARD, U. S. ARMY.

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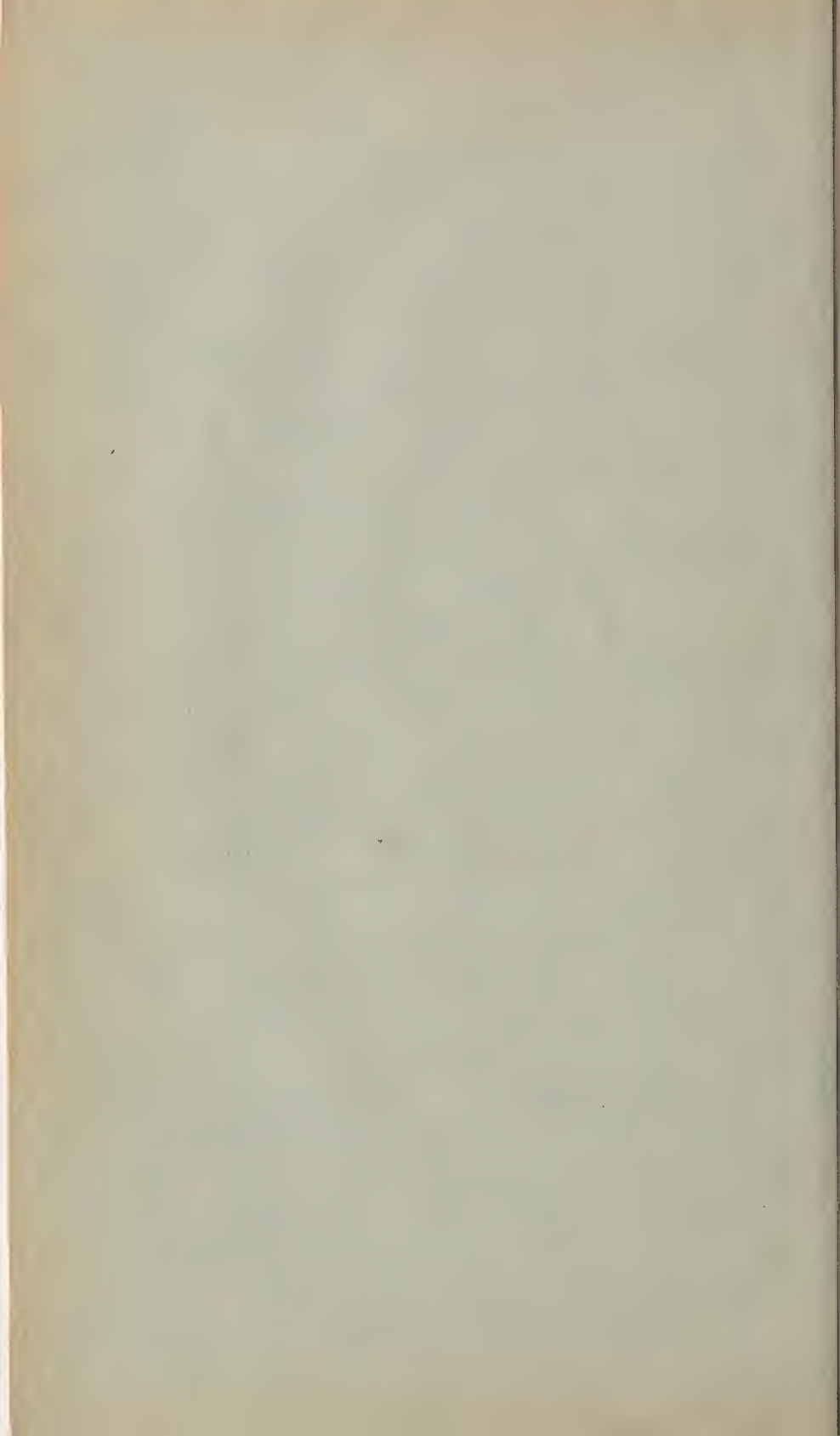
HENRY McELDERRY,

*Assistant Surgeon, U. S. A.,*

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT, U. S. A.

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New Orleans, La., 1884-'85.



The World's Industrial and Cotton Centennial Exposition.

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## Medical Department, United States Army,

EXHIBIT.

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### DESCRIPTION OF THE MODELS OF HOSPITAL STEAM-VESSELS,

From the U. S. Army Medical Museum,

WASHINGTON, D. C.

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THESE models are intended to illustrate the plans actually employed during the war of 1861-5 for adapting the ordinary steamboats of the interior rivers of the United States, and the merchant steam-vessels of the Atlantic coast, to the transportation of sick and wounded soldiers.

It was, of course, on the Mississippi river and its tributaries, in the rear of the great western armies, that the methods of fitting up river-boats were brought to the greatest perfection. The military operations in the Mississippi valley, during the greater part of the war, were so related to these streams that they offered the most convenient and economical routes of transportation, and the numerous large river-steamboats, which in times of peace are occupied in transporting merchandise and passengers on these waters, required comparatively little alteration to convert them into commodious hospital-boats, well adapted to the transportation of the sick and wounded.

From the capacious dimensions of these boats, and their smooth motion through the waters of the broad streams on which they floated, this method of transportation undoubtedly secured greater comfort to the patients than was possible in the case of the railroads, or of coast-wise transportation. Indeed, on emergencies, as after battles, these boats often served, without any special fitting up, to convey the wounded in comparative comfort to the base hospitals. But early in the war several of the most spacious and commodious of the Mississippi river passenger steamboats were specially devoted to the service of the sick

and wounded, and were specially fitted up as hospital-boats, or indeed it may be said as *floating hospitals*; placed under the command of a surgeon in charge, and making frequent trips between the army in the field and the base hospitals, most of which were accessible by the river or its branches. The model of the hospital steamboat *D. A. January* is intended to illustrate this class of vessels.

*Model of the U. S. Army Hospital Steamboat D. A. January.*—This model was constructed under the immediate supervision of Assistant-Surgeon A. H. Hoff, U. S. Army, who was for a long time surgeon-in-charge. It is five feet long, being on the scale of one-fourth of an inch to the foot, and represents the whole vessel, with beds, &c., in position, all details being carefully worked out. The following statement with regard to this vessel was furnished by Dr. Hoff:

"The hospital steamer, *D. A. January*, was built in Cincinnati, Ohio, in 1856. She was a side-wheel steamboat of 450 tons burthen, 235 feet in length, 35 feet beam, and extreme width 65 feet. She had two high pressure engines, 22-inch cylinders, and seven feet stroke; also a donkey-engine connecting with a steam-pump as a protection against fire.

"She was purchased by the Government in the spring of 1862; underwent some alterations, and made her first trip in April, 1862, arriving at Pittsburg Landing in the midst of the battle of Shiloh, loaded with a large supply of hospital stores for the purveyor at that point.

"In the fall of 1862 she was completely fitted up, as shown in the model, with all the requirements of a general hospital, with a capacity of 400 beds. (See *Fig. 1.*)

"The medical officers consisted of one surgeon and three assistant-surgeons, with the necessary attendants, nurses, cooks, &c.

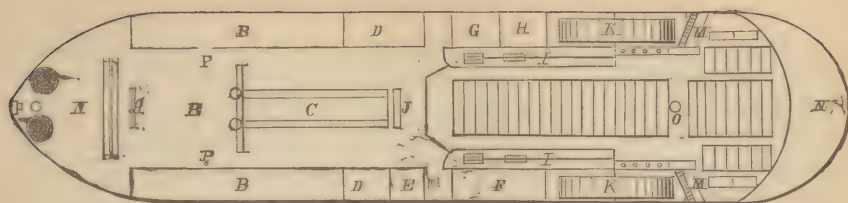
"The Commanding-General, by order, arranged the running of all hospital steamers so that they could not be interfered with by the subordinate commanders, and once under way with their load of sick and wounded were not disturbed until their destination was reached. Our flag was considered a flag of truce, fully protected us, and gave us an opportunity of keeping the hospitals always in order. No persons were allowed passage on the steamers except those connected directly with the medical department of the army.

"To overcome the difficulty as to supplies, and the prompt payment of men employed on the boat, the 'surgeon-in-charge' was made an 'acting assistant quartermaster' and 'commissary of subsistence,' and this arrangement worked most satisfactorily, and enabled the boat to be always in readiness to leave at a moment's notice.

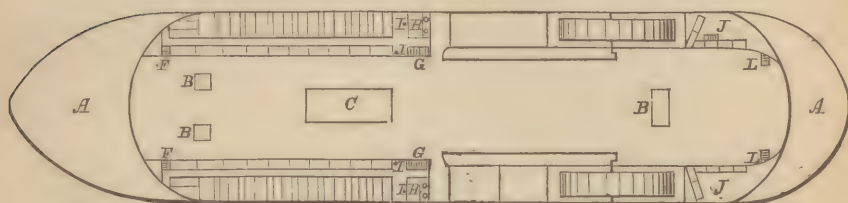


U. S. HOSPITAL STEAMER D. A. JANUARY.





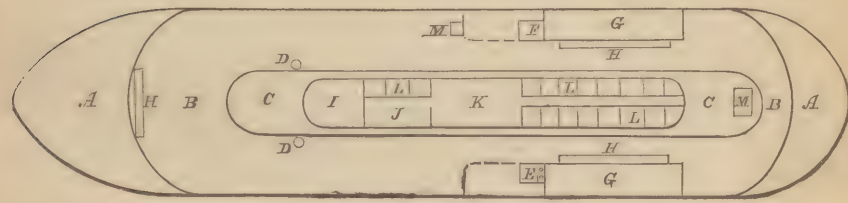
BOILER DECK.



MIDDLE DECK.



CABIN FLOOR.



UPPER DECK or TEXAS.

FIG. 1.—DECK PLANS OF THE HOSPITAL STEAMBOAT D. A. JANUARY. Scale, 54 feet to the inch.

*Boiler Deck.*—A A, Foot of the stairs. B B B, Space for wood and coal. C, Boilers. D D, Stores. E, Pastry-room. F, Kitchen. G, Carpenter's shop. H, Blacksmith shop. I I, Engines. J, Doctor. K K, Wheels. M M, Water-closets. N N, Deck. O, Space for beds. P P P, Ice-water stands.

*Middle Deck.*—A A, Lower deck. B B B, Hatchways. C, Boilers. F F, Beds for patients: stairs to lower deck near the letters. G G, Stairs to upper deck, H H, Water-closets. I I I, Ice-water stands. J J, Nurses' quarters. L L, Stairs to lower deck.

*Cabin Floor.*—A A, Lower deck. B, Office: main stairs by the letter. C C, Private rooms. E E, Texas stairs. F F, Steamboat smoke-stacks. G G G, Stoves. I, Nurses' dining-room. J, Kitchen. K K, Bath-rooms, with hot and cold water. L L, Steamboat wheels. M M, Water-closets. N, Private rooms. O, Drug store. P, Surgery. Q, Linen-room. R, Looking-glass. S S S S, Ice-water stands. The parallelograms indicate the position of the beds.

*Upper Decks, or Texas.*—A A, Lower deck. B B, Roof. C C, Cabin roof above the skylights. D D, Smoke-stacks. E, Water-closet. F, Wash-room. G G, Wheels. H H H, Water-tanks. I, Captain's room. J, Social hall. K, Texas Dining-room. L L L, Rooms for steamboat officers. M, Private room.

"A large quantity of ice was carried in the hold of the vessel; this was taken advantage of by an arrangement of pipes to convey 'ice water' to the different parts of the hospital. A tank was placed on the upper deck forward, connected with the steam-pump, and kept constantly filled with water; pipes from this ran down into the hold of the vessel to a coil embedded in the ice, whence the cold water made its way through pipes to the several parts of the boat where it was required. This worked admirably, giving all hands plenty of ice water, and with great economy in the use of the ice.

A fan ran through the whole length of the main ward, worked by the machinery below; it made about ninety revolutions a minute, and as the transom-windows opened just above it at the sides, it created a pleasant current of air, and had besides another effect that was not taken in consideration at the time the fan was ordered, viz., that it drove out all flies and mosquitos. The fan is seen in the model, but the water-pipes could not be shown."

Assistant-Surgeon A. H. Hoff, U. S. Army, then surgeon U. S. volunteers, was assigned to the command of this boat by order of Major-General Halleck, April 6, 1862, and continued to render efficient service as the surgeon-in-charge until February, 1864, when he was succeeded by Surgeon Lewis C. Rice, U. S. volunteers, who continued in charge until the boat made her last trip and was turned over to the quartermaster at St. Louis, Missouri, September 25, 1865.

During this period the boat made numerous trips from the rear of the western armies to St. Louis, Cincinnati, Mound City, Keokuk, and other points. Moreover, during the months of March, April, May, and June, 1863, she lay near Milliken's Bend, Louisiana, and served as a floating hospital for the armies under General Grant. Altogether 23,738 patients were carried by her, of whom 530 died *en route*, as is shown by the following list of trips:

*List of Trips of the Hospital Steamer D. A. January.*

PLACE AND DATE OF EMBARKATION.		PLACE AND DATE OF LANDING.		Number carried.	Died on the way.
Pittsburg Landing, Tenn.....	1862. April 11...	St. Louis, Mo.....	1862. April 14...	431	17
	April 18...	Keokuk, Iowa.....	April 23...	284	4
Pittsburg Landing, Tenn.....	May 2 ...	( New Albany, Ind.....	May 4....	300	39
		( Cincinnati, Ohio.....	May 6....		
Pittsburg Landing, Tenn.....	May 10...	Jefferson Barracks, Mo.....	May 14...	284	7
Total.....				1299	67

PLACE AND DATE OF EMBARKATION.		PLACE AND DATE OF LANDING.		Number Carried.	Died on the way.
		Brought forward.....		1260	67
Pittsburg Landing, Tenn.....	1862. June 9 ...	Jefferson Barracks, Mo.....	1862. June 12...	375	1
Pittsburg Landing, Tenn.....	June 19...	{ Paducah, Ky.....	June 20...	459	3
		{ Jefferson Barracks, Mo.....	June 22...		
		{ Keokuk, Iowa.....	June 23...		
Paducah, Ky.....	July 6 ...	{ Evansville, Ind.....	July 7....	287	2
		{ Louisville, Ky.....	July 8....		
Helena, Ark.....	July 17...	Jefferson Barracks, Mo.....	July 21...	317	10
Paducah, Ky.....	July 25...	Jefferson Barracks, Mo.....	July 27...	298	.....
Paducah, Ky.....	Aug. 4 ..	St. Louis, Mo.....	Aug. 6....	144	.....
Helena, Ark.....	Aug. 20...	Mound City, Ill.....	Aug. 23...	160	1
Paducah, Ky.....	Aug. 23...	Mound City, Ill.....	Aug. 23...	30	.....
Helena, Ark.....	Sept. 29.	St. Louis, Mo.....	Oct. 3....	386	14
Helena, Ark.....	Oct. 7 ...	Stmr. <i>T. L. McGill</i> , Colum- bus, Ky.	Oct. 10...	273	6
Columbus, Ky.....	Oct. 12...	St. Louis, Mo.....	Oct. 15...	372	.....
Columbus, Ky.....	Oct. 21...	Mound City, Ill.....	Oct. 23...	88	.....
Columbus, Ky.....	Oct. 30...	Keokuk, Iowa .....	Nov. 4 ...	378	1
Columbus, Ky.....	Nov. 18.	St. Louis, Mo.....	Nov. 21...	410	2
Columbus, Ky.....	Nov. 28.	Jefferson Barracks, Mo.....	Nov. 30...	435	.....
Helena, Ark.....	Dec. 9 ...	St. Louis, Mo.....	Dec. 16...	440	13
Arkansas Post, Ark.....	1863. Jan. 14...	{ Memphis, Tenn.....	1863. Jan. 18...	432	54
		{ St. Louis, Mo. ....	Jan. 28...		
Served as receiving hospital at	March....			1174	46
Milliken's Bend, La, during	April.....	Transferred to other hospi-		1460	79
the months of.....	May .....	tal steamers, etc.....		736	19
	June .....			1195	58
Milliken's Bend, La.....	Aug. 11..	St. Louis, Mo.....	Aug. 18...	378	16
Vicksburg, Miss.....	Aug. 27...	Memphis, Tenn.....	Aug. 31...	387	2
Vicksburg, Miss.....	Sept. 5...	Memphis, Tenn.....	Sept. 8...	377	9
Vicksburg, Miss.....	Sept. 15..	Memphis, Tenn.....	Sept. 18...	244	5
Vicksburg, Miss.....	Sept. 29.	Memphis, Tenn.....	Oct. 7....	78	1
New Orleans, La.....	Oct. 28...	Cairo, Ill.....	Nov. 2....	100	2
Memphis, Tenn.....	Nov. 23..	{ Cairo, Ill.....	Nov. 25...	345	3
		{ St. Louis, Mo.....	Nov. 27, 28 }		
Nashville, Tenn. ....	Dec. 9...	Evansville, Ind.....	Dec. 12...	344	.....
Total .....				13401	411

PLACE AND DATE OF EMBARKATION.		PLACE AND DATE OF LANDING.		Number Carried.	Died on the way.
		Brought forward.....		13401	411
New Albany, Ind.....	1864. Feb. 11...	Jefferson Barracks, Mo.....	1864. Feb. 15...	97	
Louisville, Ky.....					
Louisville, Ky.....	Mar. 18, 19	Madison, Ind.....	March 19	463	
Louisville, Ky.....	April 7...	Madison, Ind.....	April 8...	382	
New Albany, Ind.....					
Jeffersonville, Ind.....					
Vicksburg, Miss.....	April 27..	Memphis, Tenn.....	May 1, 2.	398	1
Memphis, Tenn.....	May 1...	Cairo, Ill.....	May 3...		
Cairo, Ill.....	May 3...	Louisville, Ky.....	May 8...		
Mound City, Ill.....	May 3...	New Albany, Ind.....	May 9...	289	
Mound City, Ill.....	May 14...	Jefferson Barracks, Mo.....	May 17...		
Nashville, Tenn.....	May 22...	New Albany, Ind.....	May 26...	239	
Mound City, Ill.....	June 10...	Jefferson Barracks, Mo.....	June 12...	120	
Louisville, Ky.....	June 21...	Evansville, Ind.....	June 22...	498	
Evansville, Ind.....	June 22...	Jefferson Barracks, Mo.....	June 25...		
Memphis, Tenn.....	Aug. 10...	Jefferson Barracks, Mo.....	Aug. 16...	345	6
Memphis, Tenn.....	Aug. 22..	Jefferson Barracks, Mo.....	Aug. 27...	309	1
Helena, Ark.....	Sept. 2...	Jefferson Barracks, Mo.....	Sept. 9...	332	5
Helena, Ark.....	Sept. 19..	Jefferson Barracks, Mo.....	Sept. 24...	229	4
Memphis, Tenn.....	Sept. 20..				
Duval's Bluff, Ark.....	Oct. 12...	Mound City, Ill.....	Oct. 19, 20	407	21
		Jefferson Barracks, Mo.....	Oct. 22...		
Mouth of the White river, Ark....	Nov. 3...	Cairo, Ill.....	Nov. 6...	127	
Mouth of the White river, Ark....	Nov. 10..	Mound City, Ill.....	Nov. 14...	48	
Nashville, Tenn.....	Nov. 25..	Evansville, Ind.....	Nov. 29..	361	1
Nashville, Tenn.....	Dec. 1...	Jefferson Barracks, Mo.....	Dec. 5...	416	2
Louisville, Ky.....	Dec. 19...	Covington, Ky.....	Dec. 21...	545	
Jeffersonville, Ind.....		Cincinnati, Ohio.....			
		Camp Dennison, Ohio.....			
Louisville, Ky.....	Dec. 26...	Cincinnati, Ohio.....	Dec. 27...	496	
Jeffersonville, Ind.....		Covington, Ky.....			
Louisville, Ky.....	1865. Jan. 5....	Cairo, Ill., (for transfer to St. Louis.)	1865. Jan. 8.....	426	1
Jeffersonville, Ind.....					
Eastport, Miss.....	Jan. 27, to	Mound City, Ill.....	Feb. 5....	373	31
Waterloo, Ala.....	Feb. 4...	Memphis, Tenn.....	Feb. 8....		
		Total .....		20301	483

PLACE AND DATE OF EMBARKATION.		PLACE AND DATE OF LANDING.		Number Carried.	Died on the way.
		Brought forward.....		20301	483
Eastport, Miss.....	1865. Feb. 12...		1865.		
Waterloo, Ala.....	Feb. 14...	New Albany, Ind..... Jeffersonville, Ind.....	Feb. 19...	318	5
Johnsonville, Tenn.....	Feb. 14...				
Nashville, Tenn.....	Feb. 16...				
Chickasaw, Ala.....	Mar. 12-19	Jeffersonville, Ind.....	March 23	554	8
New Orleans, La.....	April 13..	Baton Rouge, La.....	April 14..	192	.....
New Orleans, La.....	Apr. 17, 18	{ Stmr. <i>Eleanor Carroll</i> at New Orleans, La. Vicksburg, Miss.....	April 24..	169	.....
			April 25..		
Selma, Ala.....	May 6...				
Mobile, Ala.....	May 8...	New Orleans, La.....	May 15...	389	12
Fort Gaines, Ala.....	May 9...	Mound City, Ill.....	May 25...		
New Orleans, La.....	May 18...				
New Orleans, La.....	May 31, June 2.	{ Vicksburg, Miss..... Memphis, Tenn.....	June 5...	560	.....
Vicksburg, Miss.....	June 5...		June 8...		
		Stmr. <i>W. Butler</i> at Cairo, Ill., (for transfer to Nashville.	June 10...		
New Orleans, La.....	June 20...		June 28...	229	7
Baton Rouge, La.....	June 21...	Cairo, Ill.....	June 29...		
Vicksburg, Miss.....	June 23...	Jefferson Barracks, Mo.....			
New Orleans, La.....	July 17...				
Baton Rouge, La.....	July 18...	Cairo, Ill.....	July 24...	328	3
Cairo, Ill.....	July 24...	Jefferson Barracks, Mo.....	July 26...		
New Orleans, La.....	Aug. 3, 9				
Baton Rouge, La.....	Aug. 10..	Cairo, Ill.....	Aug. 16...	439	11
Vicksburg, Miss.....	Aug. 12..	Jefferson Barracks, Mo.....	Aug. 18...		
New Orleans, La.....	Aug. 26...				
Baton Rouge, La.....	Aug. 27..	Cairo, Ill.....	Sept. 3...	259	1
Vicksburg, Miss.....	Aug. 28...	Jefferson Barracks, Mo.....	Sept. 4...		
		Total.....		23,738	530

*Model of the U. S. Army Hospital Steamship J. K. Barnes.*—On the Atlantic coast a certain number of river steamboats were employed in the transportation of the sick and wounded, especially from the Army of the Potomac to Alexandria, Washington, D. C., and Baltimore. But it was also necessary to employ ocean transportation on a very considerable scale, and both in the conveyance of patients from the Army of the Potomac and from the various coast expeditions, the merchant steamships ordinarily used in the coastwise trade served for this purpose. Here, too, in times of emergency, the vessels chartered by the quartermaster's department for the transportation of stores often served to transport the sick and wounded, but a number of vessels were also devoted exclusively to this service and were fitted up as hospital steamships. The model of the U. S. Army hospital steamship *J. K. Barnes* is intended to illustrate the mode of fitting up vessels of this class which was found most convenient.

This model was constructed by Mr. Charles Hemjé, of New York, under the supervision of Assistant-Surgeon A. H. Hoff, U. S. Army, who also directed the original fitting up of the vessel. The model is seven feet long, being on a scale of three-eighths of an inch to the foot, and represents one lateral half of the vessel, the section being made longitudinally through the median line, thus permitting the display of the interior arrangement of bunks, &c.

The U. S. Army hospital steamship *J. K. Barnes* was fitted up in New York city during the latter part of 1864, and on her completion Assistant-Surgeon Thomas McMillin, U. S. A., was assigned as surgeon-in-charge, December 5, 1864. December 23d, the *Barnes* was ordered to report to the Medical Director of the Department of the South, at Hilton Head, S. C., where she took her first load of sick on board January 1, 1865.

The *Barnes* was 223 feet in length, beam 35 feet 2 inches, depth of hold 22 feet 9 inches. She was of 1,253 tons burthen. Diameter of cylinder 60 inches, stroke of piston 10 feet. In fitting her up, an orlop deck was introduced, and a mess-room was built on the forward deck, in front of the galley. The arrangement of bunks, &c., is shown in Figure 2.

Assistant-Surgeon Thomas McMillin, U. S. A., continued to act as surgeon-in-charge of this vessel until November, 1865. During this time 3,655 patients were carried, of whom 29 died *en route*. The following is a list of the trips:

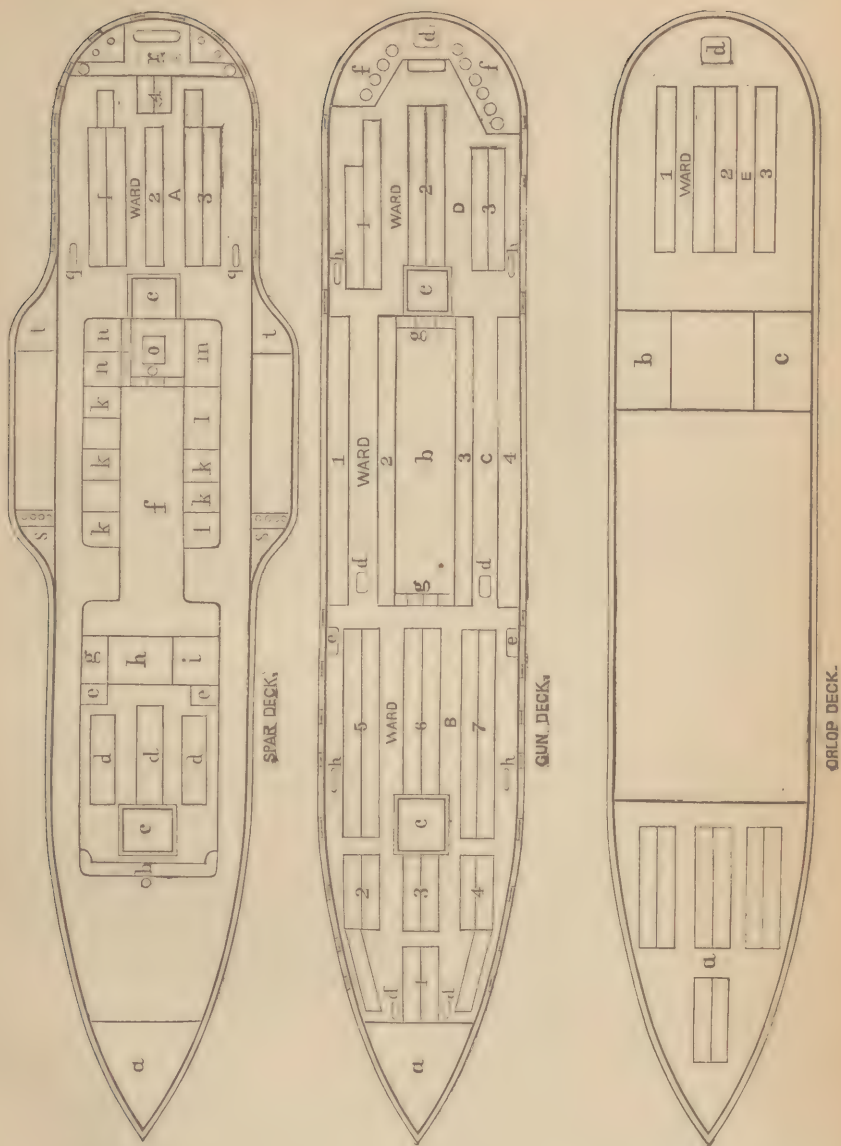


FIG. 2.—DECK-PLAN OF THE U.S. ARMY HOSPITAL STEAMSHIP J. K. BARNES. Scale,  $38\frac{1}{4}$  feet to the inch. Spar Deck.—a, Fore-castle. b, Table. cc, Hatches. ddd, Mess-tables and mess-room. ee, Pantries. gg, Officers' mess. h, Galley. i, Ice house. kkkkk, Quarters of medical officers. ll, Linen-room. m, Saloon. n, Wine-room and office. o, Table. qq, Heaters. r, Bath-room and water-closet. ss, Water-closets. tt, Guard-room. Ward A, 1, 2, 3, 72 bunks.

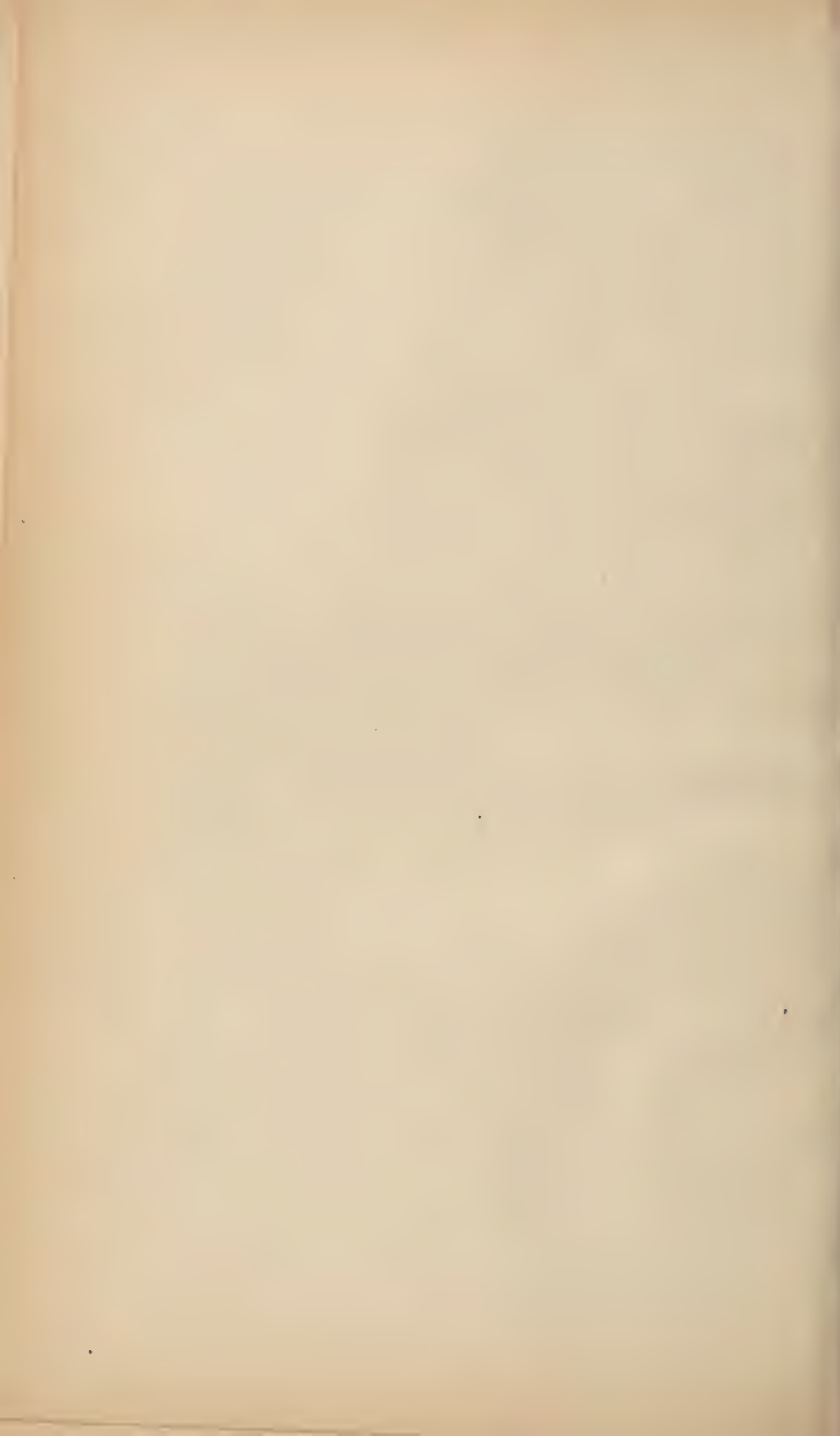
Gun Deck.—a, Commissary store-room. b, Engine. cc, Hatches. dddd, Ventilators. ee, Wash-tables. ff, Water-closets. gg, Closets. hhhh, Steam heaters. Ward B, (forward,) 1, 2, 3, 4, 5, 6, 7, 138 bunks. Ward C, (midships,) 1, 2, 3, 4, 42 bunks. Ward D, (aft,) 1, 2, 3, 63 bunks.

Orlop Deck.—a, Quarters for nurses. b, Knapsack-room. c, Baggage-room. d, Ventilator. Ward E, 1, 2, 3, 48 bunks.

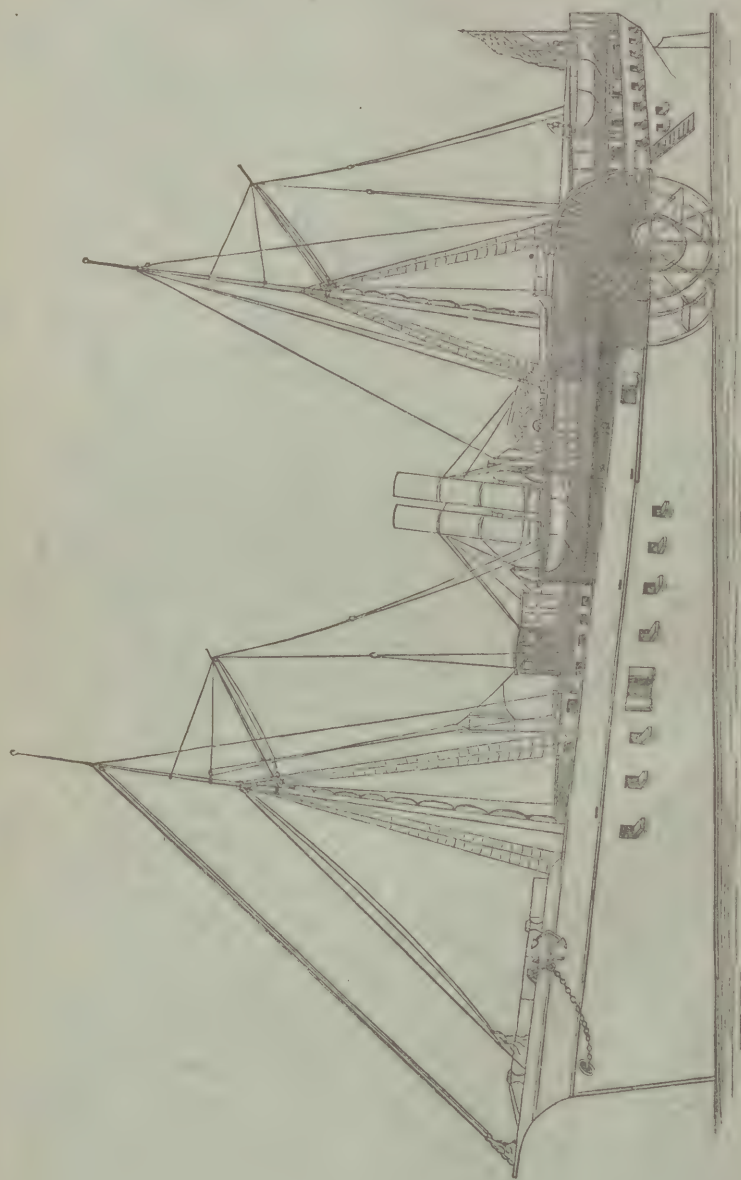
*List of Trips of the Hospital Steamer J. K. Barnes.*

PLACE AND DATE OF EMBARKATION.		PLACE AND DATE OF LANDING.		Number Carried.	Died on the way.
Hilton Head and Beaufort, S. C.	1865. Jan. 1.....	David's Island, De Camp G. H., N. Y.	1865. Jan. 5, 6	56	2
New Orleans, La.....	Jan. 31.....	Willett's Point, Grant G. H., N. Y.	Feb. 9.....	11	2
Savannah, Ga.....	Feb. 25.....	Beaufort, S. C.....	Feb. 26.....	9	.....
Beaufort, S. C.....	" 26.....	St'm'r <i>Northern Light</i> , Port Royal.	" 27.....	6	.....
Beaufort, S. C.....	Mar. 14.....	} Fort Schuyler, McDougall G. H., N. Y.	Mar. 19.....	320	1
" (Stmrs. <i>Spaulding &amp; Atlantic</i> )	" 15.....				
Wilmington and Morehead City, N. C.	April 5.....	David's Island, De Camp G. H., N. Y.	April 11.....	439	6
Beaufort, Newberne, and Morehead City, N. C.	Apr. 24, 25	{ David's Island, De Camp G. H., N. Y., Willett's Point, Grant G. H., N. Y., Fort Schuyler, McDougall G. H., N. Y....	April 28.....	449	2
Hilton Head and Beaufort, S. C.	May 7.....	Washington, D. C.....	May 11.....	385	.....
Savannah, Ga., Hilton Head, S. C.	May 19.....	Alexandria, Va.....	May 23.....	375	1
New Orleans, La.....	June 9.....	Philadelphia, Pa.....	June 17.....	217	.....
New Orleans, La.....	July 8.....	New York city.....	July 16.....	21	.....
Key West, Fla.....	Aug. 5.....	{ David's Island, De Camp G. H., N. Y.....	Aug. 23.....	345	5
Barrancas and Fort Pickens, Fla.	" 10.....				
Mobile, Ala.....	" 12.....				
Beaufort, S. C.....	" 16.....				
Hilton Head, S. C.....	" 17.....				
Charleston, S. C.....	" 19.....				
Morehead City and Newbern, N. C.	" 21.....				
New Orleans, La.....	Sept. 19.....	{ David's Island, De Camp G. H., N. Y.....	Oct. 1.....	338	6
Savannah, Ga.....	" 26.....				
Hilton Head, S. C.....	" 27.....	{ David's Island, De Camp G. H., N. Y.....	Nov. 4.....	198	4
New Orleans, La.....	Oct. 23.....				
Pensacola, Fla.....	" 25.....				
Key West, Fla.....	" 27.....				
Savannah, Ga.....	" 30.....				
Hilton Head, S. C.....	" 31.....				
Morehead City, N. C.....	Nov. 2.....				
Total.....				3655	29









HOSPITAL STEAMER J. K. BARNES.

The World's Industrial and Cotton Centennial Exposition,  
NEW ORLEANS, LA., 1884-'85.

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Medical Department, United States Army,  
EXHIBIT-CLASS 3.

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No. 3.

DESCRIPTION

OF THE

MODELS OF HOSPITAL CARS,

FROM THE U. S. ARMY MEDICAL MUSEUM,

WASHINGTON, D. C.

HENRY McELDERRY,

*Assistant Surgeon, U. S. A.,*

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT, U. S. A.

New Orleans, La., 1884-'85.



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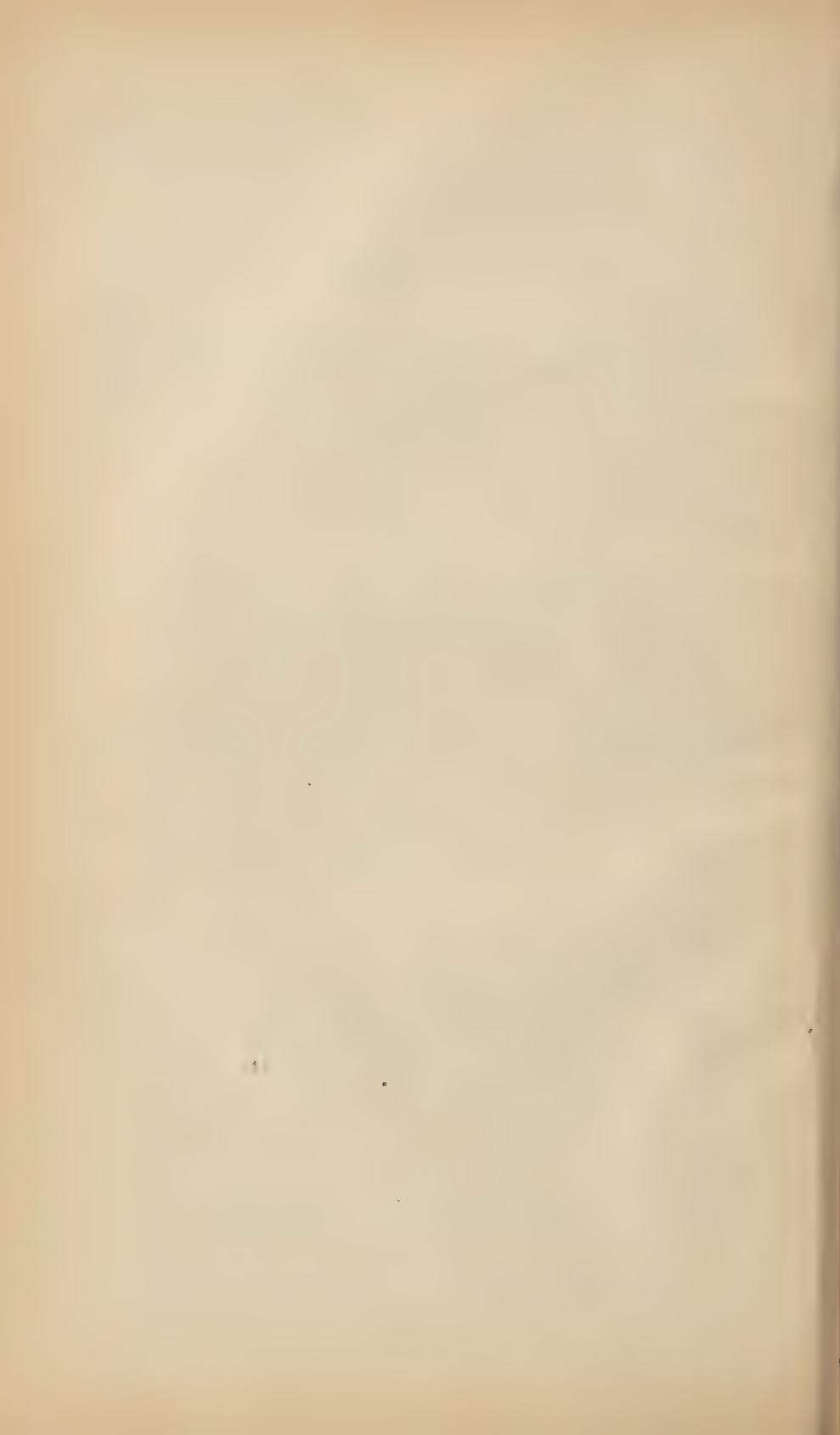
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DESCRIPTION OF THE MODELS OF HOSPITAL CARS,  
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THESE models are intended to represent especially those methods of adapting the ordinary rolling-stock of American railroads to the transportation of sick and wounded soldiers, which were found to be most satisfactory during the war of 1861-5. They are all on the scale of one inch to the foot, and are made of hard wood and brass, all details being carefully worked out; they are made with their roofs removable to permit the inspection of the interior. They were constructed in accordance with plans furnished from the Surgeon-General's office, by J. G. Brill & Co., car builders, Thirty-first and Chestnut streets, Philadelphia, Pa.

Various plans were adopted by the several armies, some of them as early as the summer of 1861, a description of which may be found in a recent report by Assistant-Surgeon G. A. Otis, United States Army.\* As might have been anticipated, these methods were brought to the greatest perfection in the rear of the great Western armies, after they began to move southward from Chattanooga. While these armies were operating chiefly on the Mississippi river and its tributaries, hospital steamboats, one of which is represented by the model of the *D. A. January*, afforded a convenient mode of transporting their sick and wounded to the general hospitals at the base of operations and in the

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\* G. A. OTIS, Assistant-Surgeon U. S. Army. *A report on a plan for transporting wounded soldiers by railway in time of war, with descriptions of various methods employed for this purpose on different occasions.* WASHINGTON: WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE, 1875.

Northwestern States; but after they concentrated at Chattanooga this was no longer feasible, and it became necessary to extend considerably the arrangements already made by the Army of the Cumberland for the transportation of its own sick and wounded on the railroad from Chattanooga to Nashville and Louisville. The first hospital cars on this route were run between Nashville and Louisville, before the concentration alluded to, but the service was subsequently extended to Chattanooga, and afterwards to Atlanta.

Surgeon George E. Cooper reports that when he became Medical Director of the Department of the Cumberland, in May, 1864, he found a train of hospital cars, which had been fitted up under the direction of Acting Assistant-Surgeon J. B. Barnum, already in operation on the line, one hundred and eighty-five miles in length, between Louisville and Nashville. This service he rapidly extended, using freight cars to some extent, but giving the preference to passenger cars fitted up with litters, so as to carry the patients in the recumbent position, until, as Dr. Otis states in the report above referred to, before the close of the year 1864, "there were three hospital railway trains, each consisting of ten or twelve cars, with several freight or baggage cars attached sometimes, connecting the advance of the army with Nashville and Louisville; one train at least daily leaving the vicinity of the field hospitals. In each train, one car was fitted up exclusively as a kitchen and store room, and another as a dispensary, with accommodation for the medical officer in charge, and an ample supply of medicines, stores, instruments, and appliances.

"These cars were fitted up under the immediate supervision of Medical Director Cooper, and of Surgeon O. O. Herrick, 34th Illinois volunteers.

"General Thomas accorded the fullest authority to Medical Director Cooper to select for the hospital trains the best locomotives and cars to be found among the rolling-stock, and to have new cars fitted up whenever necessary, and caused to be detailed for the hospital service the most experienced conductors, engineers, and other employés of the several railway lines. Medical Director Cooper informs the reporter that the smoke-pipes of the locomotives of the hospital trains were painted of a brilliant scarlet; the exterior of the hood, and of the tender-car with water and fuel, were of the same conspicuous color, with gilt ornamentation. At night, beneath the head-light of the engine, three red lanterns were suspended in a row. These distinguishing signals were recognized by the Confederates, and the trains were never fired upon or molested in any way. Dr. Cooper was informed by wounded Confederate officers in Nashville, who were captured at the battle near that place,

of the stringent orders given his troopers by General N. B. Forrest for the non-interference with, and protection of, the U. S. A. hospital trains, by giving them timely warning in the event of the railway being obstructed or torn up. The partisan troops of Colonel John Morgan's command had similar instructions. It is related, that on one occasion Colonel Morgan's scouts stopped the train directed by Dr. Barnum, and having switched it off upon a siding, after inquiring if there were sufficient stores on the train for the sick and wounded, they tore up the main track, and then rifled and destroyed five supply trains that successively arrived at the point where the line was interrupted.

"Ventilation, without exposure to drafts, was well provided for in these cars, by windows in the elevated part of the ceiling, and by valvular openings near the roof.

"When General Sherman's army was before Atlanta, until the lines of communication were destroyed, preparatory to the march to the sea, hospital cars ran regularly from the front to base hospitals, some of which were four hundred and seventy-two miles distant."

Assistant-Surgeon F. L. Town, U. S. A., in a report on these hospital trains, states that "the conception of a complete hospital, with all its appliances and means of comfort, propelled by steam, was first carried into practical operation in the medical department of the West, and its perfect success was most gratifying to all. In visiting these hospital trains the air is found sweet and pure, the wards neat and inviting, and it may unhesitatingly be said that men on hospital trains are often as comfortable, and better fed and attended, than in many permanent hospitals."

The operations of the Army of the Potomac led it for a large part of its history to occupy such camp sites that water transportation was available, and was extensively used for its sick and wounded. While this army lay along the Rapidan, however, transportation by rail became necessary, and a number of hospital cars were constructed for the purpose. Specially-constructed hospital cars were also used on several of the Northern railroads, and various plans for both freight and passenger cars were employed by the Confederate authorities. An account of these devices will be found in the report of Dr. Otis, already alluded to.

To illustrate this subject, five models have been constructed. No. 1 represents the surgeon's car of a hospital train of the Army of the Cumberland. No. 2, the kitchen car of a hospital train of the Army of the Cumberland. No. 3, the form of car found most satisfactory for the transportation of sick and wounded in the Army of the Cumberland. No. 4, a hospital car of the Army of the Potomac. No. 5, a freight car fitted up with litters for transporting sick and wounded.

No. 1. *Surgeon's Car, Hospital Train of the Army of the Cumberland.*—This model represents an ordinary passenger car, with the seats removed, and with partitions and fixtures introduced, so as to lodge the surgeon in charge of the train and his hospital steward, and give accommodations for the dispensary of the train, with an office for the transaction of business.

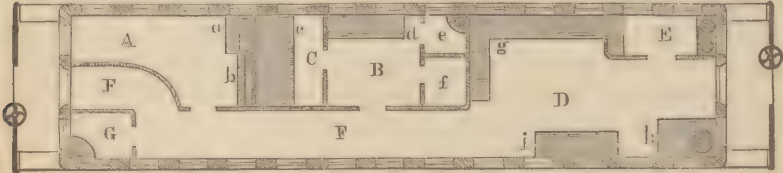


FIG. 1.—Horizontal plan of surgeon's car, Army of the Cumberland.

Figure 1 represents the arrangements of this car.

A, dispensary and steward's quarters; *a*, desk and book-case; *b*, shelves for medicines. This apartment contains also a revolving chair at the desk and a bed for the steward.

B, surgeon's sitting-room; *d*, lounge; *e*, water-closet; *f*, clothes-closet.

C, surgeon's bed-room; *c*, bed.

D, office; *g*, lounge; *h*, water-cooler; *i*, wood-box and stove.

E, wash-room, with water-basin, tank, and dressing locker.

F F, passage through car.

G, water-closet.

No. 2. *Kitchen Car, Hospital Train of the Army of the Cumberland.*—This model represents an ordinary passenger car with the seats removed, and with partitions and fixtures introduced for a kitchen, store-room, and dining-room.

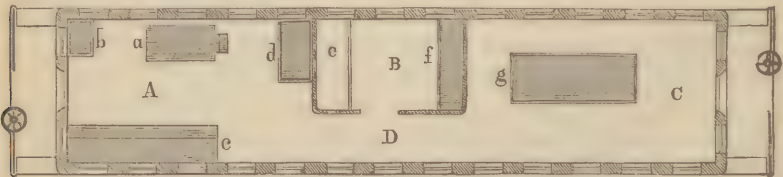


FIG. 2.—Horizontal plan of kitchen car, Army of the Cumberland.

Figure 2 represents the arrangements.

A, kitchen; *a*, cooking-range; *b*, sink; *c*, cupboard; *d*, table and shelves.

B, store-room; *e*, ice-box; *f*, shelves for provisions.

C, dining-room; *g*, table, surrounded by benches. This apartment contains also a stove and wood-box.

No. 3. *Car for Sick and Wounded, Hospital Train of the Army of the Cumberland.*—This model represents an ordinary passenger car, fitted up in the manner reported by Medical Director Cooper to be “the simplest and best form.”



FIG. 3.—Horizontal plan of one of the hospital cars of the Army of the Cumberland.—(OTIS.)

Figure 3 is a horizontal plan of the arrangements. Figure 4 is a

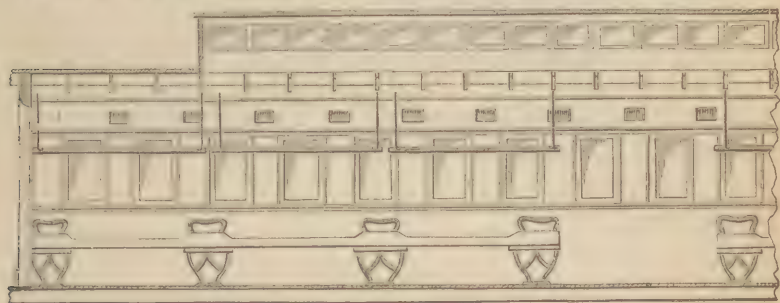


FIG. 4.—Longitudinal section of one of the hospital cars of the Army of the Cumberland.—(OTIS.)

longitudinal section of a part of the car. Figure 5, a transverse section.

The arrangements were as follows:

The alternate seats of the passenger car were removed, and suitable slats laid upon them for the reception of mattresses. On one side of the car, one of the beds was omitted, and two windows and the adjoining panelling being removed, a wide door was introduced, “affording an ample space for the ingress and egress of litters with the most severely wounded patients.” Eleven beds were thus formed, above each of which an ordinary field stretcher, with its handles shortened, was suspended by means of two iron hooks,

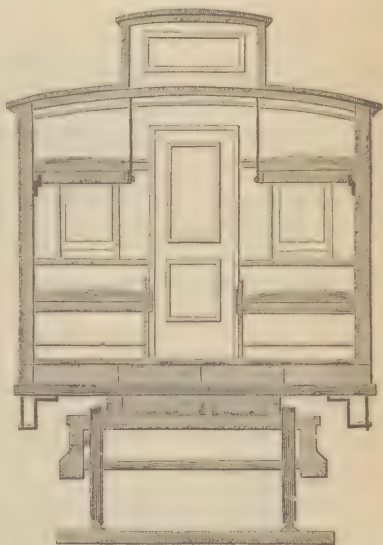


FIG. 5.—Transverse section of one of the hospital cars of the Army of the Cumberland.—(OTIS.)

one at each end, fixed in the side of the car, and two iron rods terminating in hooks, which were fastened above to the roof of the car. Eleven additional beds were thus provided, so that the car would carry twenty-two patients, one to each bed; but the lower beds were so wide, (about 44 inches,) that two patients could be carried in each when deemed expedient, (especially mild cases,) in which case the car carried thirty-three patients. Each car was provided with a water-closet, stove, wood-box, and water-cooler.

No. 4. *Hospital Car of the Army of the Potomac*.—This model represents the form of a hospital car devised by Mr. J. McCrickett, Assistant Superintendent of Military Railroads, and recommended for construction by Surgeon R. O. Abbott, U. S. A. The cars were not passenger cars refitted, but were specially devised for the purpose, the frame-work being plain, and constructed with a special view to strength. All the details of the frame-work are faithfully worked out in the model. Figure 6 is a horizontal plan. Figure 7, a longitudinal section of a part of one of the cars. Figure 8, a transverse section.

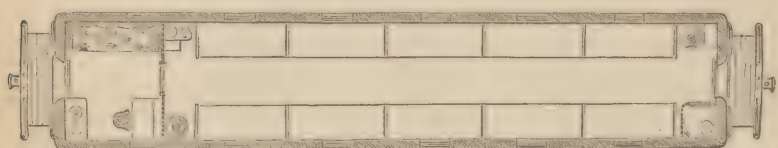


FIG. 6.—Horizontal plan of one of the hospital cars of the Army of the Potomac.—(OTIS.)

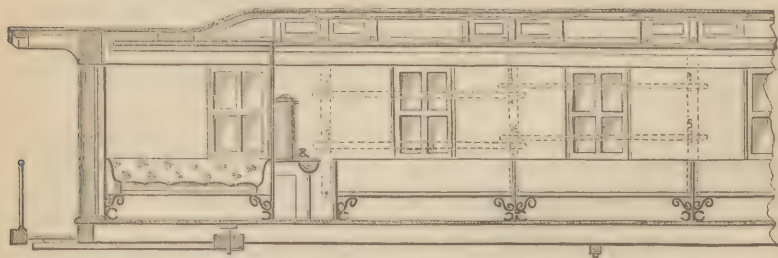


FIG. 7.—Longitudinal section of a part of one of the hospital cars of the Army of the Potomac.—(OTIS.)

The cars were 45 feet long and  $8\frac{1}{2}$  broad, inside measure. Six and a half feet were partitioned off at one end of the car for the medical officer in charge of the car. This apartment was fitted up with a desk, shelves for books and medicines, revolving chair and lounge. In the rest of the car, ten beds were constructed, by placing seats like those used in passenger cars, but without backs, at suitable intervals. On these, slats were laid for the reception of mattresses. Ten beds were thus formed,

which, however, were narrower than those of the hospital car of the Army of the Cumberland, (viz., thirty inches wide,) being intended for the reception of a single patient each. A passage-way three and a half feet wide was thus left. Above each of these beds two ordinary field stretchers, with their handles shortened, were suspended in the following manner: Opposite the middle of each of the seats supporting the lower beds, an upright wooden post was erected, extending from the floor to the roof, and firmly fastened at each extremity. Each stretcher was supported in its place by means of two iron hooks, (one at each end,) fastened to the side of the car, and two leather loops, (one at each end,) fastened to the upright posts. Beds were thus provided for thirty patients in all. Two stoves, a water-cooler, and a water-closet completed the outfit, and in order to give ready access to the severely wounded, carried on stretchers, the door at the end of the car, intended for patients, was made three and a-half feet wide.



FIG. 8.—Transverse section of one of the hospital cars of the Army of the Potomac.—(OTIS.)

No. 5. *Freight Car fitted up for the Transportation of the Sick and Wounded.*—This model is intended to represent the plan devised by Grund, a German master machinist, and adjudged the most suitable for freight cars by the Prussian Commission of 1868.

It consists in supporting three ordinary field stretchers in the front, and three in the rear part of the freight car, twenty feet long, by means of transverse wooden bars, resting on semi elliptical plate springs. The springs are spiked at one end to the flooring, to keep the bars stationary, while at the other end are rollers, to permit the yielding of the springs. The latter are surmounted by U pieces, or clips to receive the

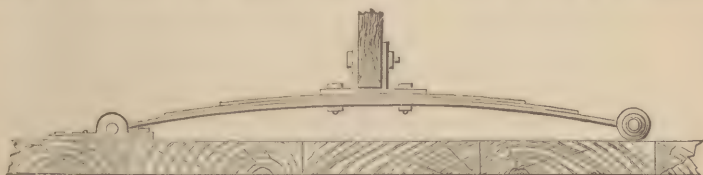


FIG. 9.—Enlarged view of the spring used in Grund's system, and adopted in the Bavarian trains, for the support of litters.—(OTIS.)

cross-bars. Four cross-beams and eight springs constitute the outfit requisite for the reception of six litters." Figure 9 represents one of these springs, which are three feet in length. Figure 10 is a longitudinal section of a part of the freight car arranged in this manner, showing a stretcher in position. The freight car represented in the model is the ordinary box-car of the Pennsylvania railroad, which is twenty-seven feet long by seven and a half broad, inside measure. By a different arrangement of the springs, eight stretchers might be accommodated, as is shown in a partial model, representing the floor of a car of the same size.

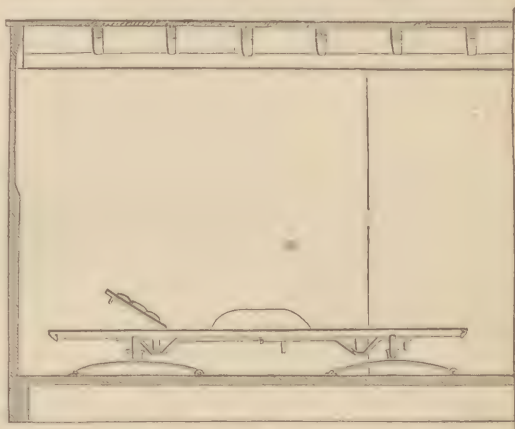


FIG. 10.—Longitudinal section of a part of a freight car arranged on Grund's system.—(OTIS.)

Assistant-Surgeon Otis has recommended that, in any future war, the Quartermaster's Department of our army should be authorized to keep on hand a supply of these semi-elliptical springs. Trains going to the front with provisions, forage, or ammunition, should then each carry, suspended under the roof, a sufficient number of these springs, with the spikes required, to enable the car on its return, instead of going back empty, to carry comfortably, on beds improvised by means of the ordinary field stretchers, a number of sick or wounded, corresponding to its size. Assistant-Surgeon Otis has also suggested that these springs might be utilized in connection with field stretchers for the comfortable conveyance of the wounded in ordinary army wagons.













The World's Industrial and Cotton Centennial Exposition,

NEW ORLEANS, LA., 1884-85.

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Medical Department, United States Army,

EXHIBIT-CLASS B.

HENRY McELDERRY.

*Assistant Surgeon, U. S. A.,*

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT, U. S. A.

---

No. 4.

DESCRIPTION

OF THE

U. S. ARMY MEDICAL TRANSPORT CART,

MODEL OF 1876:

BY

D. L. HUNTINGTON, *Assistant Surgeon, U. S. A.,*

AND

GEORGE A. OTIS, *Assistant Surgeon, U. S. A.*

---

New Orleans, La., 1884-85.



The World's Industrial and Cotton Centennial Exposition,

NEW ORLEANS, LA., 1884-85.

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Medical Department, United States Army,

EXHIBIT-CLASS 3.

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IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT, U. S. A.

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No. 4.

DESCRIPTION

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U. S. ARMY MEDICAL TRANSPORT CART,

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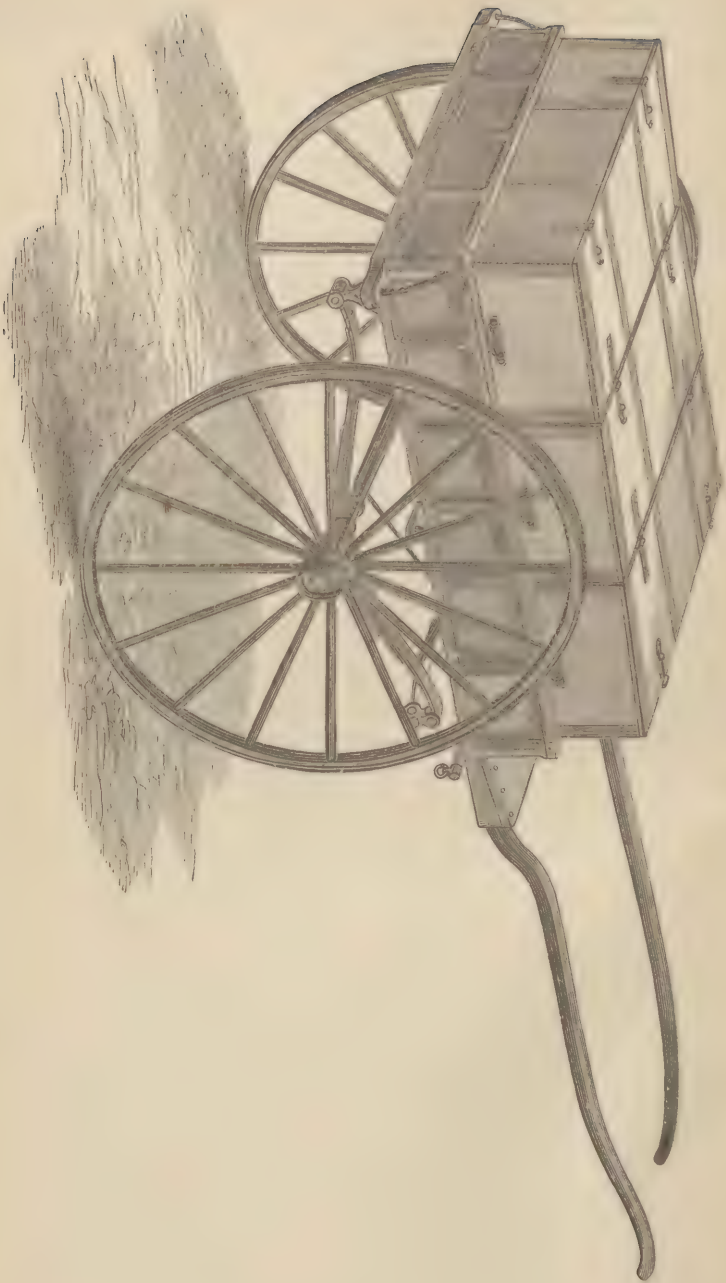
D. L. HUNTINGTON, *Assistant Surgeon, U. S. A.,*

AND

GEORGE A. OTIS, *Assistant Surgeon, U. S. A.*

---

New Orleans, La., 1884-85.



L. S. A. MEDICAL TRANSPORT CART, MODEL OF 1876.

The World's Industrial and Cotton Centennial Exposition,  
NEW ORLEANS, LA., 1884-'85.

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Medical Department, United States Army,  
EXHIBIT.

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DESCRIPTION OF THE U. S. ARMY MEDICAL TRANSPORT CART,  
MODEL OF 1876.

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The principal means of transport for field medical and hospital supplies employed in the Union armies in the late civil war were the ordinary wagons of the supply trains, ambulance wagons, the medicine wagons of Perot and of Danton, the regulation army medicine wagons, and panniers designed for transport by pack animals, but usually carried by the most available wheeled vehicles. For the last ten years, field parties of troops engaged in hostile operations against the savages of the Plains, or of the mountainous western region, have carried their medical supplies either in the regulation medicine wagons, drawn by six mules, or in chests or panniers, placed in the ordinary wagons of the supply train. The necessity of some convenient means for the rapid transport of a limited supply of medical and hospital stores, such as might be required in emergencies by a small body of troops, became apparent. Scouting parties and escorts to exploring or surveying expeditions required an outfit of hospital appliances for immediate use, yet could not be encumbered with the large medicine wagons that carried supplies for brigades.

Under these circumstances, recalling that Paragraph 1330 of the Army Regulations permitted the provision of "two-wheeled transport carts for hospital supplies" for small commands,\* although the provision had never been carried into effect, the exigencies of the late war having de-

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\* *United States Army Regulations of 1861*, with an Appendix, containing the Changes and Laws affecting Army Regulations and Articles of War to June 25, 1863, Washington, 1863, p. 317.

manded more bulky means of transport, the Surgeon General decided to have built an experimental one-horse, two wheeled, medical transport vehicle, to serve, if it should prove satisfactory, as a model for the construction of others, for issue to troops likely to be engaged in the field. This proposition having been approved by the Secretary of War, the Surgeon General indicated certain indispensable requisites to be observed in regard to the dimensions, weight, and strength of the proposed vehicle, and instructed Assistant Surgeon G. A. ORR, the medical officer on duty with a Board of Officers convened to recommend a pattern of ambulance wagon for army use, to confer with the commandant of Watervliet Arsenal, Brevet Brigadier General P. V. HAGNER, Ordnance Department, and to prepare specifications for such a hospital transport cart. The specifications submitted were as follows:

### MEDICAL TRANSPORT CART.

#### REQUISITES.

1st. To be large enough to carry three (3) boxes for stores, each 18 inches wide, 36 inches long, and 18 inches high.

2d. The weight of the finished cart, with wheels and empty boxes, must not exceed 600 lbs., and have strength of frame sufficient to withstand a load of 800 lbs.

3d. The cart-wheels must be interchangeable with the hind wheels of the new ambulance wagon.

#### SPECIFICATIONS.

**WHEELS.** The wheels will be 4 feet 2 inches high (without tires); the hubs of best elm  $6\frac{1}{2}$  inches in diameter at centre,  $5\frac{1}{2}$  inches at butt, and  $4\frac{1}{2}$  inches at the point, by 9 inches in length; butt with iron bands on each end mortised for sixteen (16) spokes. Size of mortise  $1\frac{1}{2}$  inches by 9-16 inch with a  $\frac{1}{2}$  inch dish. Spokes (best seasoned hickory)  $1\frac{1}{4}$  inches by  $\frac{3}{4}$  inch (hub tenon) felloe tenon, round  $\frac{3}{4}$  inch in diameter; felloes (best hickory)  $1\frac{1}{2}$  inches, two (2) pieces for each wheel; tire (best charred iron)  $1\frac{1}{2}$  inches wide, by  $\frac{3}{4}$  inch thick, fastened on with eight (8) tire-bolts in each wheel; two (2) felloe-plates in each wheel over joints.

**AXLE.** Of best quality refined iron  $1\frac{1}{2}$  inch square for 7 inches from each collar-washer, the remainder rounded. Collar-washer  $2\frac{1}{2}$  inches in diameter,  $\frac{3}{4}$  inch thick; wheel-boxes of best quality foundry iron,  $7\frac{1}{2}$  inches long,  $1\frac{1}{2}$  inches in diameter, 7-16 inch thick at butt;  $1\frac{1}{2}$  inches in diameter, and 5-16 inch thick at point, with two (2) lugs, 2 inches long,  $\frac{1}{2}$  inch high. Oil-chamber, 2 inches long, 1-16 inch deep, to commence  $2\frac{1}{2}$  inches from the butt. Weight of box, not less than  $4\frac{1}{2}$  lbs. each. Axle to be arranged to track five feet from centre to centre of wheels.

**BODY.** Outside length  $57\frac{1}{2}$  inches, width  $40\frac{1}{2}$  inches, height 8 inches. Inside length  $51\frac{1}{2}$  inches, width 38 inches, height 6 inches. Frame, of oak, consisting of two (2) exterior side-sills and two (2) end cross-bars, size  $1\frac{1}{4}$  by  $2\frac{1}{2}$  inches. Centre cross-bar 2 inches by  $\frac{3}{4}$  inch, and two (2) interior cross-bars, at half distance between the centre and the ends, 2 inches by  $\frac{3}{4}$  inch; all cross-bars, except the tail-bar, are mortised into the side-sills, and are even with them at bottom; the tail-bar is mortised to receive the sill-tenons. The tenons of the end bars are of one-third thickness; those of the interior bars are of half the thickness. The floor planks will

be ash,  $\frac{1}{2}$  inch thick, and level with the top of the side-sills. The upper rails are  $1\frac{1}{2}$  inches by 1 inch, and extend over the sides and front, and are vertical. The side panels of the body are of ash, screwed, each side, to six (6) single studs and to a front double corner stud; the front panel of the body, also of ash  $\frac{1}{2}$  inch thick, is screwed, in like manner, to three (3) single studs and the double corner studs, to which the sides are attached. These studs are all tenoned into the side-sills and upper rails. The studs are 5 inches long; the single ones  $\frac{3}{4}$  inch by 1 inch, and chamfered at their exterior corners between the sill and upper rail. The double corner studs are made from square pieces  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches. The sides and front of the body are stayed by upright rods and flat angle-irons about the front corners and the sides, also, by upright and brace-rods at the rear. The ends of the rear cross-bar and the centre-bar project  $4\frac{1}{2}$  inches beyond each side to receive lower ends of these braces. The tail-board is framed of  $\frac{3}{8}$  inch (panel) boards of ash, screwed to five (5) studs  $\frac{3}{4}$  by 1 inch, mortised into a top and bottom rail 1 inch by  $1\frac{1}{8}$  inches. The length of tail-board extends even with the exterior of the sides. The tail-board will be hung to the rear cross-bar by three light hinges, to stand even with the end of bar when upright, and will be held closed by means of hooks attached to the sides, and hooking into eyes attached to the irons on the upper rail of the tail-board.

**SPRINGS.** Two (2) side half-springs, perpendicular to the axle, and clipped beneath it, connected in front by a cross-spring. The side-springs are to be 48 inches long, of English No. 3 oil-tempered steel, of five (5) leaves, 2 inches wide. The cross-spring, of the same number of leaves, of the same width and thickness and 38 inches long, or of sufficient length to connect the side-springs. The eye will be of double thickness, and have eye-bolts 7-16 of an inch. The spread of the springs should be as slight as will keep the body off the axle. The cross-spring will be bolted to an iron cross-piece, which is bolted to the shafts and side-sills. The side-springs will be clipped beneath the axle, by pairs of clips, screwed by nuts, with brass spring-blocks. Behind, the side-springs will be bolted to the sills by iron V-pieces, as may be found most convenient. India-rubber buffers may be interposed over the clips of the side-springs to the axle.

**THE SHAFTS** are made of ash,  $1\frac{3}{4}$  by  $2\frac{1}{4}$  inches, separated 22 inches in front, and  $30\frac{1}{2}$  inches at the foot-board. They will be somewhat curved, so as to carry the body nearly level, or with a slight inclination downwards at the rear. They are bolted to the body through the front-cross bar and the forward interior bars, being also locked by mortises  $1\frac{1}{2}$  inches deep at each bolt. A foot-board 4 feet long 8 inches wide and 1 inch thick, of oak, is bolted to the top of the side-sills, which extend 8 inches in front of the body, to receive the foot-board. The bolts also pass through triangular blocks placed between the foot-board and the sills, and also on the shafts, which give a suitable inclination to the board.

**SWINGLE-TREE AND SPLINTER-BAR.** The draft is made from the axle by means of two (2) wrought-iron rods  $\frac{1}{2}$  inch in diameter, bolted under the foot-board to an oaken splinter-bar, to which the swingle-tree is attached. The swingle-tree will conform to that used in the ambulance wagon.

**CHESTS.** There will be three (3) chests, interchangeable, and consequently of uniform dimensions, viz., 36 inches long, 18 inches wide, 18 inches high. They will be made of half-inch boards of walnut or ash, and firmly framed, and secured against splits or strains by light steel straps and angle braces. The bottoms of the boxes will be covered with sheet zinc, and the tops by cow-hide. The under corners will be supplied with strong castors, and at the middle of each end there will be strong iron folding-handles, which must not project more than half an inch when folded

down. The chests will open from above by hinged lids, and will be secured, each, by two suitable bolts and locks equidistant from either end.

**SLIDE-BOARD.** A slide-board, to lower the boxes from the cart to the ground, will be carried on iron loops attached underneath the body, so that when drawn to the rear, to be used as a slide, the hooks at the front end will hold by the rear loops, and when not wanted for use this board will slide back on its loop, and be secured by a thumb-screw.

**TARPAULIN.** A canvas cover, about  $6\frac{1}{2}$  by 5 feet, will be provided with eyelets at the four corners, to be secured to suitable adjustable fastenings to the four corner studs.

**PAINTING.** The cart will be painted of the color and finish of caissons and other ordnance carriages, the iron work black. The letters "U. S.," four inches high, will be painted at the centre of each side panel. Near the front end of each side panel a stenciled mark will be placed with the inscription, in small characters, Transport Cart  
U. S. A.  
Med. Dept.

The cart was constructed in accordance with the foregoing specifications, at Watervliet Arsenal, West Troy, under the direction of Brevet Brigadier General P. V. HAGNER, U. S. A., and was delivered at the Surgeon General's Office, in Washington, January 15, 1876, and inspected and approved.

It remained that the three chests, designed to contain respectively surgical instruments and appliances, medicines and hospital stores, mess furniture and utensils, should receive their outfit.

By direction of the Surgeon General, the fitting up and furnishing of the medicine and mess chests belonging to the medical transport cart has been entrusted to Assistant Surgeon D. L. HEXTINGTON, U. S. A. In carrying out this work, the endeavor has been made to select from the standard supply table of the Medical Department such medicines, stores, appliances, and utensils as experience has proved to be useful and necessary for the ordinary emergencies of field service, and to arrange them compactly and conveniently.

As the supply table has been strictly conformed to in the preparation of the list for furnishing these chests, it will be possible to refurnish them from the stores usually found at even the more remote frontier posts. Under the circumstances ordinarily attendant upon scouts, expeditions, and marches, it is believed that the quantity and variety of the supply furnished will be abundantly adequate for a force of not less than five hundred troops for a period of three months. The medicine chest has been divided by means of accurately fitting trays into five divisions, the trays subdivided into spaces and compartments for the disposal of medicines, appliances, etc., and, so far as possible, these spaces and compartments have been constructed with reference to the average size and form of the original package or article furnished for

the Medical Department, so that the chest may be readily and quickly filled from any dispensary.

**MEDICINE CHEST.**—The medicine chest is furnished with five trays covered by accurately fitting lids. The trays are of black walnut and are seventeen and a half inches long, sixteen and three-quarter inches wide and vary in depth and in their subdivisions.

All the trays are readily raised by apertures for the fingers cut near the upper edges of the ends and not represented in the cuts.

Tray No. 1 is five inches in depth and is subdivided into three compartments as indicated in the accompanying cut (FIG. 2.) One compartment is intended for stationery, the two others for miscellaneous articles, as enumerated in the subjoined list:

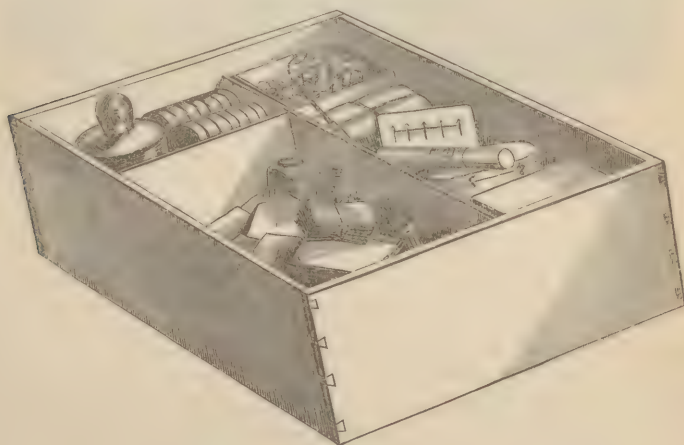


FIG. 2.—Tray No. 1 of Medicine Chest.

**COMPARTMENT A contains—**

Paper, cap, ruled, Quire 1.  
 Paper, Quarto-post, ruled, Quire 1.  
 Paper, note, ruled, Quire 1.  
 Envelopes, official, large, No. 25.  
 Envelopes, official, small, No. 25.  
 Inkstand, traveller's, filled, No. 1.  
 Pencils, lead, Faber's, No. 2, No. 6.  
 Pens, Gillott's steel, No. 12.  
 Penholders, No. 6.  
 Ink, carmine, bottles, 1.  
 Mucilage, bottles, 1.  
 Elastic rubber-bands, doz. 1.  
 Pocket register for patients, No. 1.

**COMPARTMENT B contains—**

Pill Tile, 8 by 6, No. 1.  
 Probang, No. 1.  
 Ichthyocolla plaster, in case, yards, 1.  
 Fountain syringe in case, No. 1.  
 Assorted corks, box, 1.  
 Pill Boxes, paper, No. 1.  
 Matches, in tin box, boxes 1.

**COMPARTMENT C contains—**

Brass Spirit Lamp, with wicking, No. 1.  
 Hard Rubber penis syringe, No. 1.  
 Tape measure, No. 1.  
 Suspensory Bandages, No. 6.  
 Needle-case, filled, No. 1.  
 Pins, papers 1.  
 Tape, Roll 1.

Tray No. 2, of the same dimensions as tray No. 1, is subdivided into forty-one compartments as indicated in the annexed woodcut (FIG. 3), and is intended for medicines and such pharmaceutical appliances as are necessary to fit out a temporary dispensary for the field.

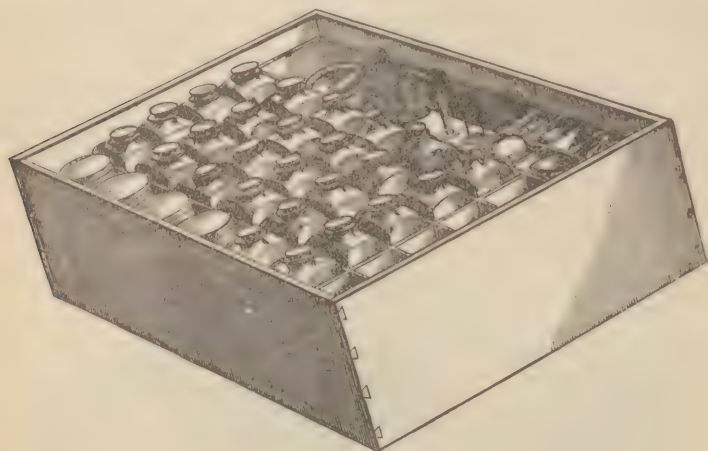


FIG.—3. Tray No. 2 of Medicine Chest.

THIS TRAY CONTAINS—

Extractum Hyoscyami, in 1 oz. pots, oz. 2.  
 Extractum Conii, in 1 oz. pots, oz. 2.  
 Extractum Belladonnæ, in 1 oz. pots, oz. 2.  
 Sodæ Bicarbonas, oz. 6.  
 Ipecacuanhæ pulvis, oz. 4.  
 Pilulæ Extracti Colocynth, Comp. (gr. } No. 500.  
     iii,) et Ipecacuanhæ, gr. ss.  
 Pilulæ Catharticæ Compositæ, No. 600.  
 Pilulæ Opii, No. 500.  
 Pilulæ Opii et Camphoræ, No. 500.  
 Pinliulæ Quæ Sulphatis (3 grains each) No. 600.  
 Pilulæ Hydrargyri, oz. 8.  
 Acidum Tannicum, oz. 4.  
 Calomel.  
 Acidum Salicylicum, oz. 4.  
 Chloral Hydrate, oz. 4.  
 Rhei pulvis, oz. 4.  
 Acaciæ pulvis, oz. 4.  
 Plumbi Acetas, oz. 4.  
 Potassæ Permanganas, oz. 4.

Zinci Sulphas, oz. 2.  
 Zinci Oxidum, oz. 4.  
 Morphiæ Sulphas, oz. 1.  
 Cupri Sulphas, oz. 1.  
 Argenti Nitras, (fused) oz. 1.  
 Bismuthi Subnitras, oz. 4.  
 Collodion, oz. 2.  
 Glycerina, oz. 4.  
 Ferri Perchloridum, oz. 1.  
 Tinctura Catechu, oz. 4.  
 Porcelain Table, and Teaspoon, No. 1.  
 Minim Glass, No. 1.  
 Hypodermic Syringe, No. 1.  
 Prescription Scales and weights in case, No. 1.  
 Mortar and pestle, Wedgewood, 3 inch, No. 1.  
 Spatulæ, (large and small,) No. 2.  
 Stethoscope, No. 1.  
 Scarificator, No. 1.  
 Scissors, No. 1.  
 Medicine Glass and Case, No. 1.  
 Corkscrew, No. 1.

The small half spaces, represented as unoccupied in the cut (Fig. 3), are left for the convenience of packing any small articles which may be considered of importance.

Tray No. 3 is six inches in depth, the other dimensions are similar to the preceding. The bottles used in both trays are eight, four, and two ounce tincture and saltmouths.



FIG. 4.—Tray No. 3 of Medicine Chest.

Linimentum (as per Standard Supply Table) oz. 8	Potassii Iodidum, oz. 8.
Aquæ Ammoniacæ oz. 8.	Pulvis Ipecacuanhæ et opii, oz. 8.
Spiritus ætheris nitrici, oz. 8.	Quiniae Sulphas, oz. 8.
Tinctura ferri chloridi, oz. 8.	Extractum Ergotæ Fluidum, oz. 4.
Extractum gentianæ fluidum, oz. 8.	Extractum Ipecacuanhæ Fluidum, oz. 4.
Tinctura Opii, oz. 8.	Spiritus Ætheris Compositus, oz. 4.
Chloroformum, oz. 8.	Acidum Carbolicum, crystals, oz. 4.
Oleum Terebinthinæ, oz. 8.	Acidum Aceticum, oz. 4.
Tinctura Opii Camphorata, oz. 8.	Linimentum Cantharides, oz. 4.
Oleum Ricini, oz. 8.	Acidum Sulphuricum, oz. 4.
Spiritus Ammoniacæ Aromaticus, oz. 8.	Acidum Nitricum, oz. 4.
Extractum Zingiberis fluidum, oz. 8.	Liquor Potassæ, oz. 4.
Cough Mixture (per Standard Supply Table) oz. 8.	Cupping Glasses, No. 6.
Tinctura Aconiti Radicis, oz. 8.	Clinical Thermometer in case, No. 1.
Potassæ Chloras, oz. 8.	Urinometer in case, No. 1.
Potassii Bromidum, oz. 8.	Spaces for powders.

Tray No. 4, of the same length and breadth as the preceding, and eight inches deep, is not subdivided into compartments, and is designed for an assortment of miscellaneous articles. Its arrangement is represented by a wood cut on the next page (Fig 5.)

THE TRAY CONTAINS:—

Unguentum Hydrargyri, Cans 1.	Vials, prescription, assorted, doz. 1.
Ceratum Simplex, Cans 1.	Trusses, single, No. 2.
Extractum Nucis Vomice, oz. 1.	Hard Rubber Syringe, 12 oz., No. 1.
Castile Soap, lbs. 1.	Sponge, fine pieces, doz. ½
Brown Soap, lbs. 2.	Portfolio, No. 1.
Candles, Sperm. lbs. 4.	Towels, doz. 1.
Candlesticks, No. 2.	Muslin, yards 6.
Nutmegs, oz. 2.	Red flannel, yards 2.
Sinapisms prepared, p'k'ge 1.	

For a list of the contents of tray No. 4, see the preceding page.

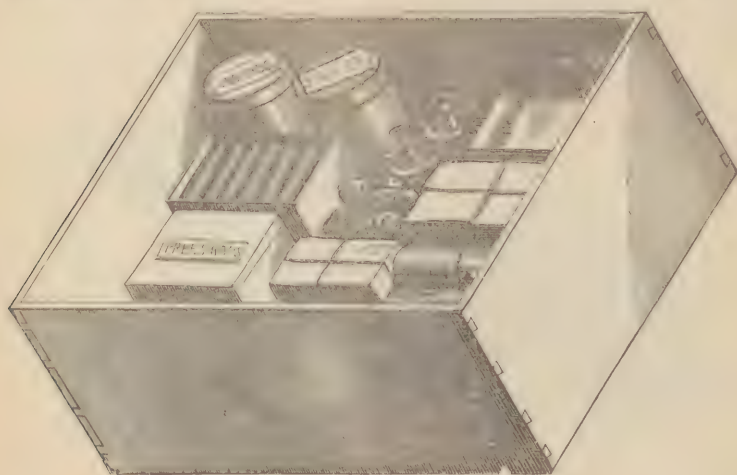


FIG. 5.—Tray No. 4 of Medicine Chest.

Tray No. 5, of the same superficial dimensions as the others and eight inches deep, is devoted to hospital stores.

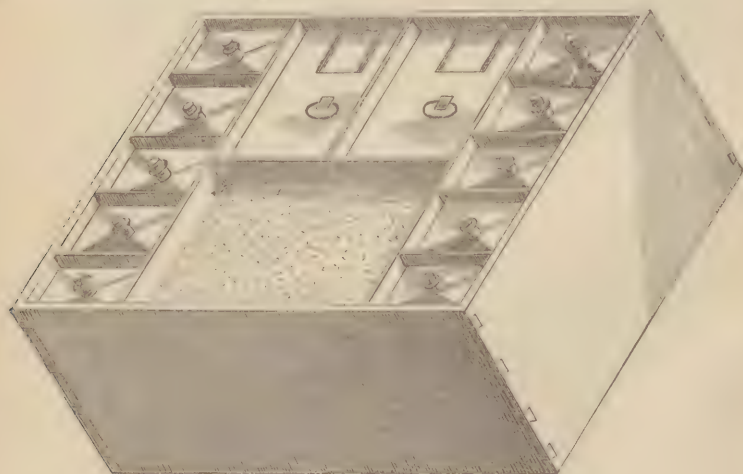


FIG. 6.—Tray No. 5 of Medicine Chest.

THE TRAY CONTAINS—

Spiritus Vini Gallici, oz. 24.  
Spiritus Frumenti, oz. 24.  
Spiritus Rectificatus, oz. 24.  
Oleum Olivæ, oz. 12.  
Syrupus Scillæ, oz. 12.

One tin can for Magnesiæ Sulphas.  
One tin can for Pulvis Lini.  
One tin can for White Sugar.  
Two spaces left to be filled at discretion.

**MESS CHEST.**—The mess chest has been furnished with such utensils as are commonly on hand at every post, and is intended to supply the wants of a temporary field hospital for twelve patients. It has a set of three black walnut trays, each twelve inches wide and sixteen inches long, fitting one above another. The remainder of the chest is left vacant for packing the larger utensils.

Tray No. 1 is four inches in depth and is subdivided as shown in the diagram, (Fig. 7.)

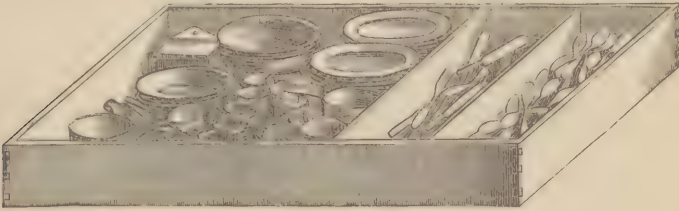


FIG. 7.—Tray No. 1, of Mess Chest.

**THIS TRAY CONTAINS—**

Knives table, No. 12.  
Knives, carving, No. 1.  
Forks, table, No. 12.  
Forks, carving, No. 1.  
Spoons, table, No. 12.  
Spoons, tea, No. 12.

Nutmeg grater, No. 1.  
Plates, tin, doz. 1.  
Pepper box, No. 1.  
Salt box, No. 1.  
Tin case for matches, No. 1.

Tray No. 2 of the mess chest is five inches in depth, and, designed for cans and packages of various sizes, is not divided into compartments.

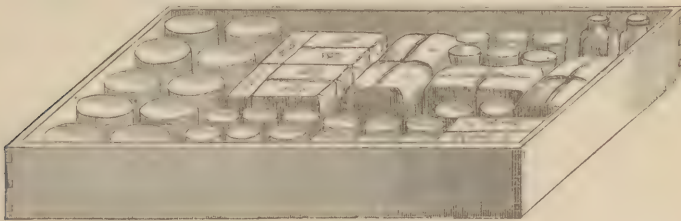


FIG. 8.—Tray No. 2, of Mess Chest.

This tray is intended to be packed with extract of beef in cans or jars, condensed milk in cans, farina in papers, corn-starch in papers, and any other article of nourishment or comfort for the sick which may be regarded as necessary by the medical officer.

Tray No. 3, six inches deep, is divided into compartments and furnished with tin cans, as indicated in the subjoined cut, (Fig. 9.)

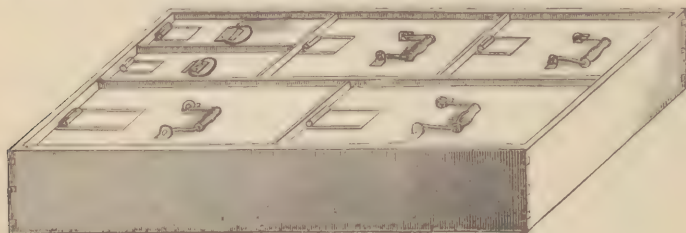


FIG. 9.—Tray No. 3, of Mess Chest

THIS TRAY CONTAINS CANS FOR—

Butter,  
Coffee, ground or green,  
Pepper,

Salt,  
Sugar,  
Tea; or for any other articles desired.

The large space in the chest unoccupied by the trays is to be packed with the following articles:

Basin, tin, washhand, No. 2.  
Cleaver, No. 1.  
Cups, Britannia, No. 12.  
Cups, tin, (1 qt., 1 pt.,) No. 2.  
Dippers, assorted, No. 2.  
Dishes, tin, No. 6.  
Grater, large, No. 1.  
Gridiron, No. 1.  
Kettles, camp, covered, No. 1.  
Kettles, tea, iron, No. 1.

Knives, butchers', No. 1.  
Ladles, No. 1.  
Lantern, No. 1.  
Pans, frying, No. 1.  
Pans, sauce, No. 1.  
Pots, coffee, tin, No. 1.  
Pots, tea, tin, No. 1.  
Saws, butchers', No. 1.  
Steelyards, No. 1.  
Trays, tin, No. 1.

To secure the articles contained in the mess chest against injury by motion, it will be advisable to pack the spaces firmly with oakum, or some yielding and clean material. Oakum is mentioned from the fact that it is nearly always found at posts, is cleanly, and, in cases of emergency, may be taken into use as a surgical dressing, or to pad splints.

In case it is thought advisable to enlarge the list above given, by the addition of the "Norwegian Kitchen," or cooking apparatus, the contents of the larger space may, by a little practice, be so economically disposed as to give sufficient room for it.

It is believed that every thing which can contribute to the well being of the sick men of a small command in the field has been provided in these chests, so far as space would allow.

**SURGICAL CHEST.**—By direction of the Surgeon General, Assistant Surgeon G. A. OTIS, U. S. A., was charged with the outfit of the surgical chest. The objects held in view were to provide an adequate supply of restoratives, anesthetics, instruments, and appliances for every primary dressing or operation needful and practicable in the field, and to eschew everything superfluous.

This chest contains, in the first place, a set of such carpenter's tools as are requisite for rough and ready work about a field hospital. These are packed in the uppermost of two black walnut trays, of the superficial dimensions of the interior of the chest, as follows:

## LIST OF CARPENTER'S TOOLS IN TRAY NO. 1.

Hand Saws, (1 rip, 1 cross) No. 2.	Tool Chest (so called) or hollow handle	} No. 1.
Key-hole Saw, No. 1.	fitted with brad-awls, etc.,	
Hammer, claw, No. 1.	Square, Carpenter's, medium size, No. 1	
Hatchet, with hammer head, No. 1.	Compass, Carpenter's, medium size, No. 1.	
Draw Knife, No. 1.	Tacks, papers, assorted sizes, No. 2.	
Chisel, $\frac{3}{4}$ inch, No. 1.	Brads, medium size, Papers, 1.	
Gouge, $\frac{1}{2}$ inch, No. 1.	Nails, shingle, lbs. 1, 8-penny, lbs. 2, 10-penny,	
Brace, and complete set of bits, No. 1.	lbs. 1.	
Screw-driver, 8 inch, No. 1.	Screws, assorted, lbs. 2.	
Wire Pliers, 1 round, 1 flat, medium size, No. 2.	Plane, smoothing, short, No. 1.	
Forceps, assorted, as used by gas-fitters, No. 3.	File, half round, medium size, No. 1.	
Screw or Monkey-wrench, medium size, No. 1.	File, rat-tail, medium size, No. 1.	
	Hone, No. 1.	

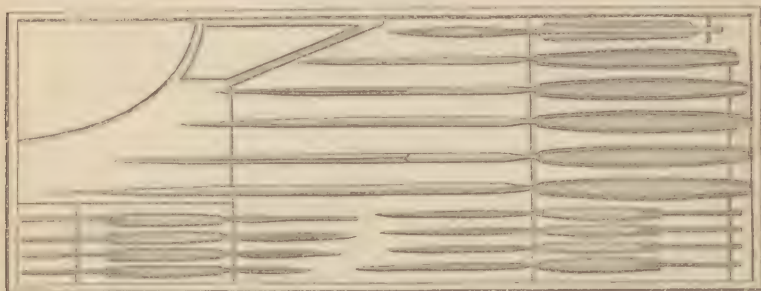
The second or centre tray is furnished with the following articles:

Candles, best sperm, lbs. 2.	Ligature, thread, best linen, 16 in. long,	} oz. $\frac{1}{2}$ .
Flint and tinder, and steel, in tin box, No. 1.	waxed, and put up in papers,	
Lamp, alcohol, Mauck's patent, in tin	Silk, best saddlers' or ligature, oz. 8.	
heating vessel,	Wire, silver suture, on spool, yds. 12.	
Note-paper, commercial, quires, 3.	Whiskey in flask, pint, 1.	
Penholders, No. 2.	1 oz. bottle strong liquor Ammonia.	
Memorandum paper, block, 1.	1 box of 100 1 gr. Opium pills.	
Pens, steel, No. 12.	1 leather covered 16 oz. flask Chloroform, with a	
Inkstand, traveller's, No. 1.	shoulder sling.	
Roller, bandages, muslin, 1 in. x 1 yd.,	Wax, yellow, in paper, oz. 8.	
12; 2 in. x 3 yds., 24; 2, 2 $\frac{1}{2}$ ins. x 3	Sponges, large, bleached, soft, bell, No. 2.	
yds., 24; 3 in. x 4 yds., 12; 3 $\frac{1}{2}$ in. x 5	Surgeon's sponge, best velvet, medium, assorted	
yds., 12; 4 in. x 6 yds., 6; 4 in. x 8	sizes, oz. 8.	
yds., 6	Splints, felt, (Ahl's,) set 1.	
Triangular compresses, large 50, small 50.	Splints, wire, anterior, (N. R. Smith's,) No. 3.	
Wire gauge, for splints, yds. 1.	Suspensory bandages, No. 6.	
Adhesive plaster, in tin cases, yds. 10.	Cesophageal tube, No. 1.	
Ichthyocolla plaster, in tin cases, yds. 4.	Brushes, for gypsum dressing, No. 2.	
Oil silk, yds. 2 $\frac{1}{2}$ .	Matches, wax, cans 6.	
Lint, patent, best flax, in rolls, lbs. 4.	Matches, ordinary, package 1.	

The third compartment or bottom of the chest is supplied as follows:

Candlesticks, No. 2.	Camel's hair brushes, in phial, No. 12.
Plaster of Paris, in tin cans, lbs. 10.	Wax tapers, boxes 2.
Chloroform, in tin can with screw stopper, lbs. 10.	Needles, sewing, assorted, 25.
Simple cerate, in can, lb. 1.	Cotton thread, spools 3.
Powdered mustard, in can, lb. 1.	Shears, for gypsum bandage, No. 1.
Twine, (stout,) 8 oz., finer, 8 oz.	Brass dressing pan, (army pattern,) No. 1.
Jack-knife, stout, with cork-screw, No. 1.	Drainage tubes, No. 6.
Spirits of camphor, oz. 16.	Napkins, for ophthalmia, doz. 1.
Elastic catheters, English, assorted, No. 6.	Roller bandages, flannel, (4 ins. x 6 yds.,) doz. 1.
Alcohol, oz. 32.	Towels, doz. 1.
Binder's board, for splints, (2 $\frac{3}{4}$ ins. x 12 ins. 6	Oakum, (q. s. to pack closely.)
pieces, 4 ins. x 17 ins., 6 pieces,) doz. 1.	Cotton, antiseptic, rolls 2.
Worsted binding, (1 in. x 6 yds.,) pieces 1.	Cotton batting, (q. s. to fill vacant spaces.)
Tape, stout linen, yds. 50	Steward's pocket case.*
Green silk, for eye shades, yards $\frac{1}{2}$ .	Compact field case.†

As the two cases of surgical instruments allowed medical officers as personal sets for capital and minor operations are, necessarily, large and inconvenient for field transportation, Dr. Otis was instructed to select a set that should constitute a *Compact Field Case*, mentioned in the preceding list (+) as part of the contents of the bottom compartment of the Surgical Chest. It has been his endeavor to place in the case such instruments as are necessary for primary operations for traumatic cause, not reducing their size below the best models in order to pack them in a narrow compass, but securing economy of space by careful packing, and, in some cases, by making parts of instruments interchangeable.



TRAY No. 1.

FIG. 10.—Tray of the Compact Field Case fitting over the compartment A, contains 1 strong cartilage knife, 1 small amputating knife, 1 medium catling, 1 medium amputating knife, 1 large catling, 1 major amputating knife, 1 straight sharp pointed bistoury, 1 curved sharp pointed bistoury, 1 probe pointed curved bistoury, 1 long straight probe pointed bistoury, 1 tenaculum, 1 large scalpel, 1 small and 1 very small knife for dissections and ligations.

In a few instances, slight modifications, suggested by the experience of the war, have been introduced in well-known patterns of the armamentarium. With the skilful collaboration of Mr. STOHLMANN, of Tienham & Co., it is believed that the effort to secure compactness, at least, has been remarkably successful. The drawings (Figs. 10, 11, 12) explain the arrangement of the case.



TRAY No. 2.

FIG. 11.—Tray of the Compact Field Case fitting into compartment B, contains 1 Hey's saw, 1 torsion forceps, 1 needle forceps, 1 artery-needle holder with 4 points and 1 key.

Two trays containing knives for amputations, excisions, and dissections, with artery needles and forceps and a Hey's saw, fit into the two

compartments of the case represented in FIGURE 12. The upper compartment, B, contains saws, probes, bullet-extractors, etc. The lower compartment, A, the tourniquet and large resecting instruments.

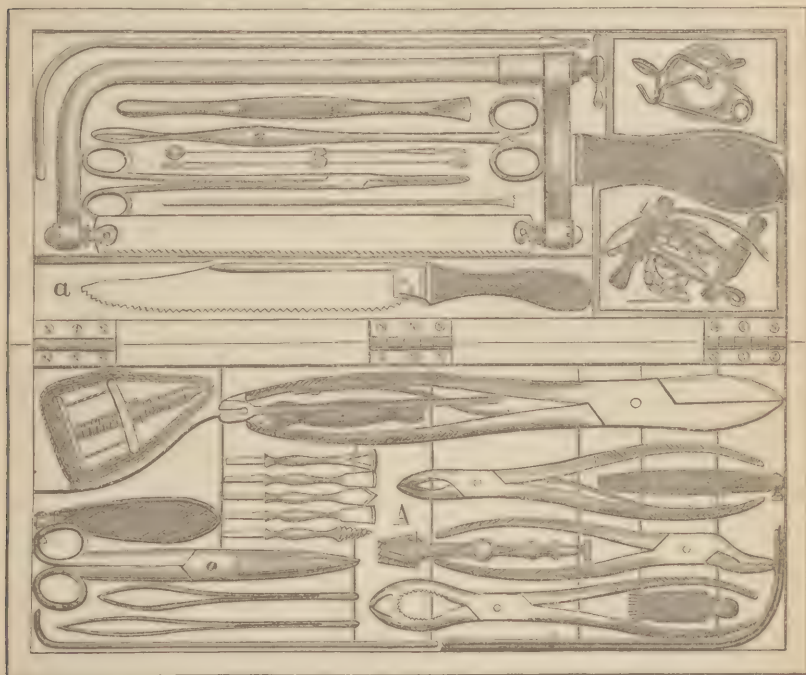


FIG. 12.—COMPACT FIELD CASE. *Compartment A* contains: 1 tourniquet, 1 large Liston's bone cutter, 1 gnawing forceps, 1 sequestrum forceps, 1 Lion forceps, 1 conical trephine, 1 trephine-brush, 2 German-silver retractors, 1 osteotome, handle with four points, 1 tire-fond, 1 Ollier's curved osteotome and chain saw conductor, 1 scissors, 1 dissecting forceps, 1 artery forceps, 1 silver grooved director. *Compartment B* contains: 1 major saw with 2 extra narrower blades, 1 movable back saw, 1 English No. 6 gum elastic catheter, 1 elevator, 1 bullet forceps, (model Gemig,) 1 bullet forceps, (model Tiemann,) 1 long articulated probe or *sonde de poitrine*, with 2 Nelaton or porcelain tips, and 1 burr-headed ball-searcher. In lower end tray, 1 chain-saw (model Charriere) with conducting needle; in upper end tray, 20 large serres-fines, 2 coils of annealed iron wire. In tray D, under movable-back saw, silk, linen and catgut ligatures, wax, silver suture wire, surgeon's curved needles, acupressure pins, 2 silver probes.

To save the surgeon's pocket case of instruments, it was thought advisable to add a steward's pocket case, (\*). This is of sheep's skin, in two folds, and holds a stout pair of scissors, a dissecting forceps, two probes, a spatula, a scalpel and bistoury folding in a shell-handle, a thumb-lancet, and, in a pocket, surgeon's needles, silk, etc.

The triangular compresses mentioned among the contents of the centre tray, are made by dividing diagonally a yard square of unsized muslin. One, in the package, is printed with Esmarch's illustrations of Mayor's system of scarf-bandaging. With these compresses are put up

fifty small compresses for primary application to fresh wounds, etc., consisting of a bit of lint and charpie, and a folded scrap of muslin: the whole enveloped in waxed paper.

The several chests were packed under the supervision of Lieutenant-Colonel C. SUTHERLAND, Assistant Medical Purveyor, U. S. A. When loaded, the surgical chest weighed 203 pounds; the medical chest, 226 pounds; the mess chest, 173 pounds.

Three folded double colored blankets, of the hospital pattern, are to be strapped on the forward chest, and a rubber blanket to be spread and secured over the entire load. It is intended that the driver may sit on the front box, and experiment shows that in this position he has good control of the reins and as firm a seat as the driver of a caisson. Iron loops or holdfasts have been attached to the forward braces of either panel for greater security.

The cart itself, without a load, weighs 420 pounds. Adding the weight of the three packed chests, or 602 pounds, allowing 50 pounds for the blankets and 148 pounds for the driver, the total weight to be drawn is 1220 pounds. As it is estimated by the best authorities (McAdam and others) that a stout cart-horse  $15\frac{1}{2}$  hands high should be equal to the traction of 3200 pounds over ordinary roads at 3 miles an hour, the weight of the entire load is within limits even for long and rapid marches.

Several officers have advised that a detached seat supported by iron stays should be constructed for the driver; but to this it has been objected that such a seat would add to the complexity and expense of the vehicle, and make it more liable to be used for other purposes than that for which it is designed, and, principally, that such an arrangement would necessitate lowering the forward box and thus destroying the uniformity in the dimensions of the chests, which is an important feature in the plan.

This pattern of medical transport cart has not yet been tested in actual service; but the preliminary practical trials that have been made with it indicate that it will prove a convenient and important addition to the army field equipment.

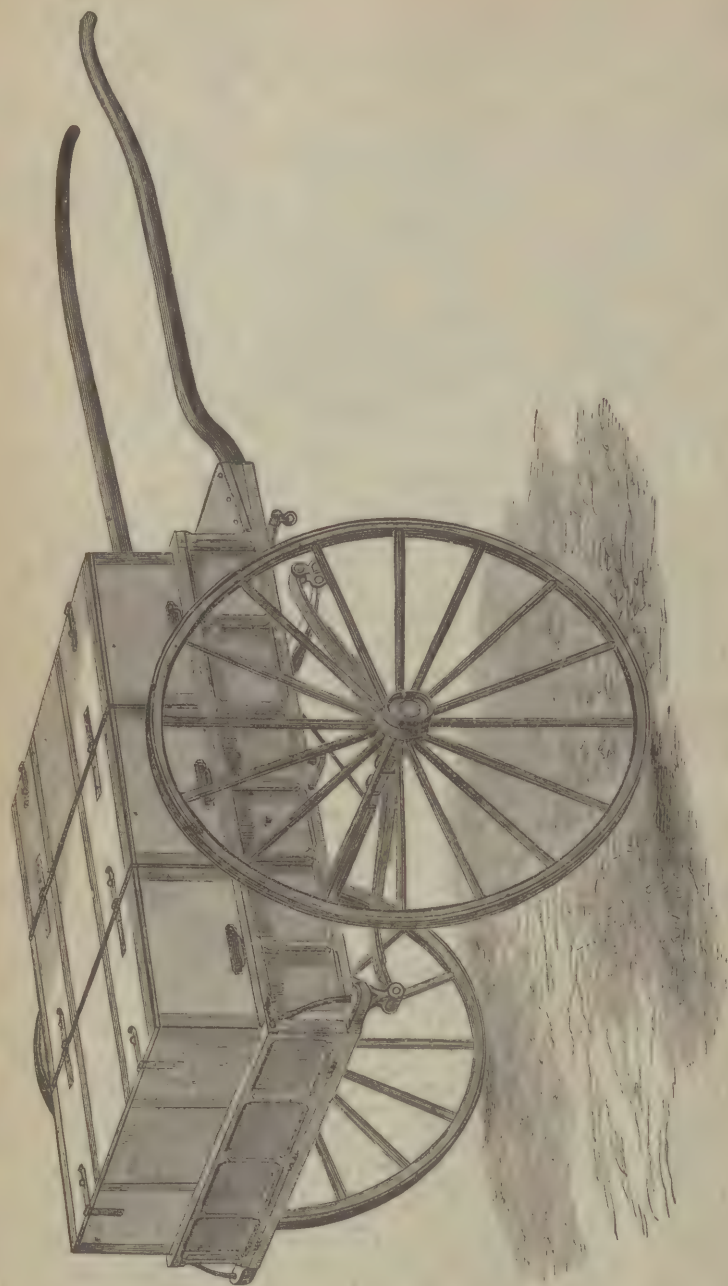
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The three chests of the U. S. A. Medical Transport Cart, intended for exhibition at the World's Industrial and Cotton Centennial Exposition, New Orleans, Louisiana, 1884-'85, was, by authority of the Surgeon General U. S. Army, repacked under the supervision of Bvt. Brig. General Thos. A. McFarlin, Assistant Medical Purveyor, U. S. A., New York City.

HENRY McELDERRY,  
Assistant Surgeon, U. S. A.,

*In charge of the Representation of the Medical Department, U. S. A.*





U. S. A. MEDICAL TRANSPORT CART, MODEL OF 1876.

The World's Industrial and Cotton Centennial Exposition,  
NEW ORLEANS, LA., 1884-85.

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Medical Department, United States Army,  
EXHIBIT-CLASS 4.

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No. 5.

DESCRIPTION  
OF  
SELECTED SPECIMENS

FROM THE

Medical and Surgical Sections of the Army Medical Museum  
AT  
WASHINGTON, D. C.,

SURGEON JOHN S. BILLINGS, U. S. A.,  
*Curator of Army Medical Museum.*

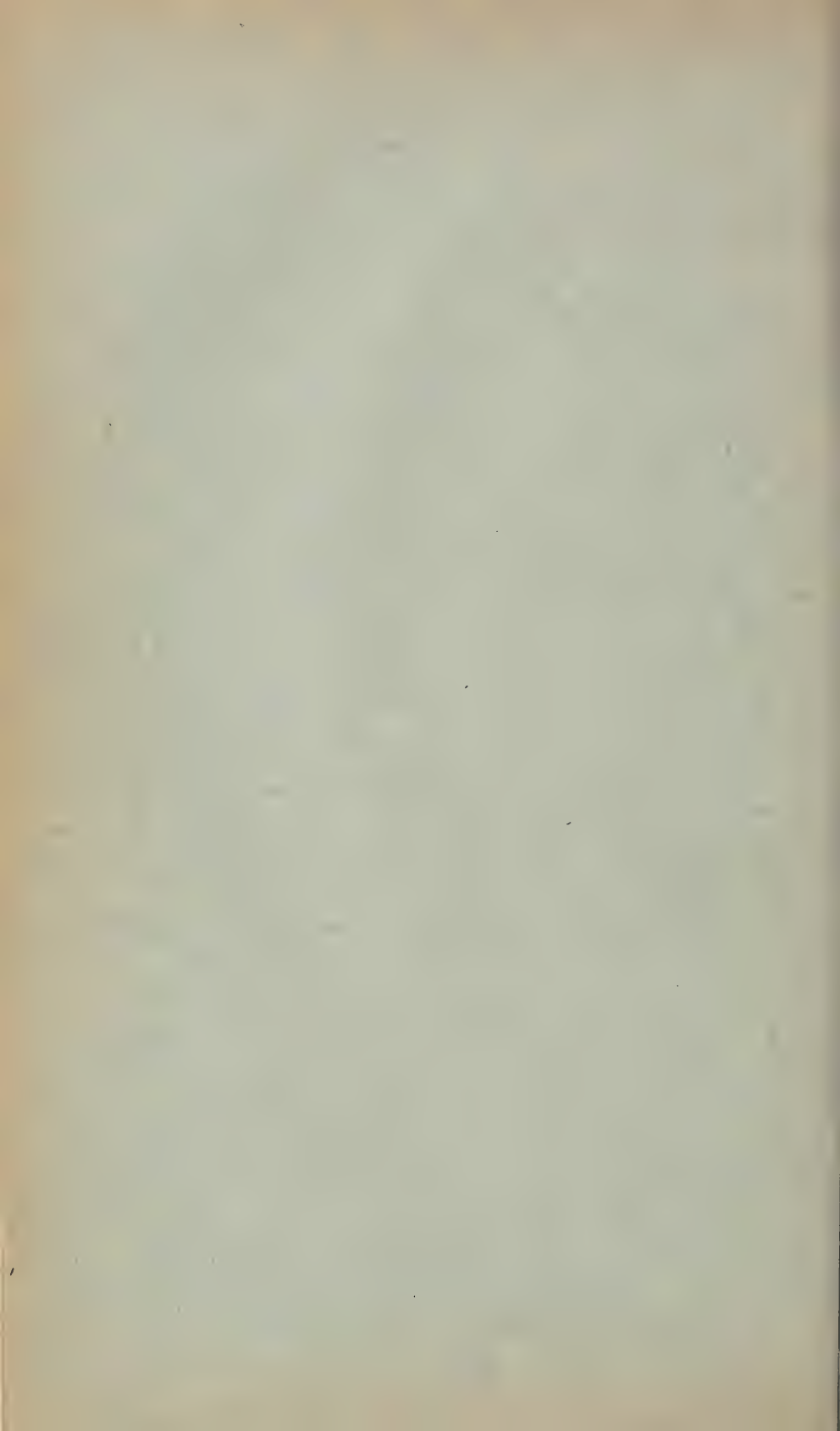
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HENRY McELDERRY.  
*Assistant Surgeon, U. S. A.,*

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT, U. S. A.

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New Orleans, La., 1884-85.



The World's Industrial and Cotton Centennial Exposition.

NEW ORLEANS, LA., 1884-85.

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Medical Department, United States Army.

EXHIBIT CLASS 4.

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No. 5.

DESCRIPTION

OF

SELECTED SPECIMENS

FROM THE

Medical and Surgical Sections of the Army Medical Museum

AT

WASHINGTON, D. C.,

BY

SURGEON JOHN S. BILLINGS, U. S. A.,

*Curator of Army Medical Museum.*

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HENRY McELDERRY.

*Assistant Surgeon, U. S. A.,*

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT, U. S. A.

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New Orleans, La., 1884-85.



*Exhibition from the Army Medical Museum*  
THE WORLD'S INDUSTRIAL AND COTTON CENTENNIAL  
EXPOSITION

AT NEW ORLEANS, LA.,

—1884-85.

*Exhibition from the Army Medical Museum*  
DESCRIPTION OF SELECTED SPECIMENS

FROM

THE MEDICAL AND SURGICAL SECTIONS

OF THE

ARMY MEDICAL MUSEUM

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The exhibition from the Army Medical Museum includes specimens illustrating normal and pathological human anatomy, comparative osteology and histology; also means of transportation of sick and wounded by land and water, plans and models of hospitals, surgical instruments and appliances, anthropometrical instruments, microscopes, culture apparatus, and surgical photographs.

The primary object of the Army Medical Museum was the collection and preservation of specimens illustrative of wounds and of the diseases of armies, as an important step in the study of the best means of diminishing disease and mortality among soldiers, and of rendering them as effective as possible. It was soon found necessary to extend the scope of the collection to include all forms of injuries and diseases, and also to obtain typical specimens of normal human and of comparative anatomy. An effort has also been made to form a collection of surgical instruments, of apparatus connected with the transportation of sick and wounded, and of instruments for diagnosis and for physiological research.

including microscopes and culture apparatus. At the present time the Museum contains 2,236 specimens in the section of normal anatomy, 2,530 in that of comparative anatomy, 9,280 specimens in the pathological section, 8,460 specimens in the microscopical section, and 108 specimens in the miscellaneous section, devoted to apparatus, instruments, etc., forming a total of 22,614 specimens, illustrative of all branches of medical and surgical science. Large as these numbers may appear, there yet remain many gaps in each series, which should be filled as rapidly as possible. The appropriations annually made by Congress for the support of the Museum are but little more than sufficient for the current running expenses of the establishment, leaving only a small margin for the acquisition of additional specimens, and the Surgeon General therefore appeals to all medical men to aid, by contribution of specimens, an institution which is already of great value and interest, having an enviable reputation both in Europe and this country, and which, it is believed, is destined to be of great importance in the advancement of medical science. In recent years, through the co-operation of the officers of the medical staff and of many practitioners in civil life, many interesting pathological specimens have been obtained; and it is gratifying to be able to state that the number of contributors is steadily increasing, as the facilities afforded by the Museum for the permanent preservation of pathological specimens, and of the records connected with them, are more and more appreciated. Practitioners—who have not the time or facilities for the making of minute dissections or preparations of morbid conditions—are usually willing to forward to the Museum the results of their operations or autopsies, feeling sure that such specimens will be carefully examined, and, if of value, properly prepared and preserved, so that they may be available for study by any physician who chooses to visit the Museum for that purpose. It is only necessary that contributors should properly pack the material for transportation by express, placing them in hermetically-sealed cans, with alcohol when

necessary, or, in the case of many specimens, packing them in sawdust or salt. Freight charges are defrayed by the Museum; and those specimens which are found to be of value are mounted permanently, and all data respecting them are placed on record.

In cases of special interest the Museum will return to its contributors photographs of the specimens after they have been properly prepared. Among the specimens which are more particularly desired at present, in order to complete the pathological series of the Museum, may be named :

1. Specimens illustrating the ultimate result of wounds and operations, especially if connected with the late war—such as *Fractures, Resections, Amputation Stumps*, etc.

2. *Aneurisms; Embolism; diseases of arteries and veins, of bursa, or of synovial sheaths; diseases of the bones or joints; hernia.*

3. *Hypertrophy localized; tumors of all kinds.*

4. Effects of *osteo-malacia, rickets, syphilis.*

5. Diseases of the *Ear, Eye, Pancreas, Skin* (including tattooing), and *supra-renal capsules.*

6. *Sclerosis or atrophy of brain and spinal cord.*

7. *Acute yellow atrophy of liver.*

8. *Contracted gouty form of liver.*

9. *Calculi; foreign bodies in situ.*

10. *Parasites*, except lumbricoids and headless tapeworms.

11. Diseases and results of *old injuries in animals.*

12. *Casts, drawings, and photographs.*

13. Specimens illustrating the pathological anatomy of scurvy, cerebro-spinal meningitis, cholera, leprosy, yellow fever.

14. *Abnormities and Deformities of all kinds; monsters.*

15. *Atrophy of old age.*

16. Specimens of skeletons, as complete as possible, of *very old men or women*, especially if the ages are known : also of bones of *very old animals*.

JOHN S. BILLINGS,  
*Surgeon U. S. Army,*  
*Curator Army Medical Museum.*

## I.—ILLUSTRATIONS OF INJURIES OF THE CRANIUM.

1. (3639.) A calvaria showing the effects of contusion by a shot projectile an inch behind the coronal suture. There is superficial necrosis without, and slight fissure and depression within. The patient survived the injury seventeen days. (See *Cat.* 1866, p. 8; *Med. and Surg. Hist.*, Part I, Vol. II, p. 146.) Donor, Dr. H. Mullen.

2. (1568.) Section of left parietal with fracture of the inner table, from oblique impact of a musket ball on the outer table. Patient died of meningitis after nine days. (See *Circ.* 6, S. G. O., 1865, p. 10; *Cat.* 1866, p. 7; *Med. and Surg. Hist.*, Part I, Vol. II, p. 142.) Contributed by Dr. R. W. Coale.

3. (2121.) Segment of right parietal; one fragment of a conical ball, which split longitudinally upon the bone, was extracted from within the cranial cavity, the other fragment lodged beneath the occipito-frontalis. The patient survived the injury thirteen days. (See *Cat.* 1866, p. 14, and *Med. and Surg. Hist.*, Part I, Vol. II, p. 181.) Donor, Surgeon J. Dwinelle, 106th Pennsylvania.

4. (3220.) Segment of the calvaria of a quadroon of 21, showing a perforation of the left parietal by a pistol ball at close range. The missile was arrested on the opposite side, after traversing both hemispheres of the cerebrum. The patient survived five days. (See *Cat.* 1866, p. 25, and *Med. and Surg. Hist.*, Part I, Vol. II, p. 318.) Donor, Surgeon E. Bentley, U. S. V.

5. (1108.) Part of cranium, showing a conoidal ball embedded and incruusted between the sphenoid and frontal bones. The aperture of entrance through the right orbit is partly obliterated by osseous depositions. The patient lived 64 days after the injury. No marked cerebral disturbance appeared until the ninth week. (See *Cat.* 1866, p. 28; *Med. and Surg. Hist.*, Part I, Vol. II, p. 205.) Donor, Dr. G. H. Dare.

6. (5116.) Base of a cranium, with a round pistol-ball embedded in the left carotid canal. The specimen was purchased with the Gibson cabinet. It was found in the catacombs of Paris; and, according to tradition, the patient survived the injury many years.

7. (5531.) Cranium of a California Indian, killed by a stone-headed arrow, which is seen penetrating the left malar bone and orbit. The skull

was found by Dr. C. Yates, in Alameda county, California, and was contributed to the Smithsonian Institution, and numbered 8106. It was transferred to the Army Medical Museum January 25, 1867.

8. (5908.) Cranium of a soldier of the 4th cavalry, killed by Indians near Fort Concho, Texas, September 30, 1870. The iron arrow-head impacted in the left temporal with but slight splintering, produced speedily fatal intracranial hæmorrhage. (See *Circular* No. 3, S. G. O., 1871, p. 150.) Donor, Brevet-Major W. M. Notson, Assistant Surgeon U. S. A.

9. (6900.) Cranium of a colored man, showing comminution and depression of the left parietal and frontal bones, the result of "butting." Donor, Dr. J. F. Hartigan.

10. (9231.) Base of cranium, showing double longitudinal fracture, caused by a kick of a horse. Death on the 10th day after the injury from cerebral hæmorrhage. Donor, Dr. D. S. Lamb.

11. (9242.) Portion of left side of vault of cranium, showing oval depressed healed fracture. The injury had been caused by a piece of shell. Death from drowning 13 years after injury. Donor, Dr. R. B. Bontecon.

## II.—ILLUSTRATIONS OF INJURIES OF THE TRUNK.

12. (2843.) Six dorsal vertebræ, showing a shot fracture of the spinous and transverse processes and lamina of the third vertebra. The ball passed through the left lung, and the patient survived only one day. (*Cat.* 1866, p. 58; *Med. and Surg. Hist.*, Part I, Vol. II, p. 435.) Donor, H. M. Dean.

13. (2762.) Third lumbar vertebra with a conoidal ball and shreds of clothing embedded. The patient died from tetanus after nine days. (*Cat.* 1866, p. 60.) Donor, Dr. G. A. Mursick.

14. (2902.) Fifth lumbar vertebra and sacrum with a musket-ball impacted in the upper left sacral foramen, from a soldier, 23 years old, wounded May 10, 1864, became paraplegic, and died May 15, 1864. (See *Cat.* 1866, p. 227; *Med. and Surg. Hist.*, Part II, Vol. II, p. 248.) Donor, Dr. O. P. Sweet.

15. (1641.) Left innominatum and longitudinal half of sacrum, from a soldier of 21 years, wounded May 3d and died July 8, 1863. A battered conoidal ball, which perforated the ilium and lodged in the sacrum, is attached. (See *Cat.* 1866, p. 228; *Med. and Surg. Hist.*, Part II, Vol. II, p. 217.) Donor, Acting Assistant Surgeon Carlos Carvallo.

16. (4130.) Left os innominatum and sacrum perforated by a shell fragment, from a soldier 35 years old, wounded April 6th, died April 28, 1865, from hemorrhage. (*Cat.* 1866, p. 228, and *Med. and Surg. Hist.*, Part II, Vol. II, p. 223.) Donor, Surgeon J. C. McKee, U. S. A.

17. (819.) Round ball impacted near the tuberosity of the right ischium, from case of Private W. L——, 23d North Carolina, wounded at South

Mountain September 12, 1862, died, as supposed, from the effects of chloroform, October 28, 1862. (See *Cat.* 1866, p. 224; *Med. and Surg. Hist.*, Part II, Vol. II, p. 242.) Donor, Dr. R. Davies.

18. (1246.) Conoidal ball impacted in right ischium. Case of Private S. W——, 23d New Jersey, wounded at Chancellorsville May 3d, died of secondary hemorrhage May 24, 1863. (See *Cat.* 1866, p. 227; *Med. and Surg. Hist.*, Part II, Vol. II, p. 242.) Donor, Assistant Surgeon W. Thomson, U. S. A.

19. (3597.) Aneurismal varix of the left femoral vessels, showing, with the varicose veins and dilated arteries, a portion of the aorta. The iliacs have been successively tied by Acting Assistant Surgeon J. B. Cutter. The patient died September 21, 1864, four days after the ligation of the primitive iliac. (See *Am. Jour. Med. Sci.*, 1864, Vol. XLVIII, p. 36; *Ibid.*, 1865, Vol. L, p. 391; *Cat. Surg. Sect.*, 1866, p. 469; *Med. and Surg. Hist.*, Part II, Vol. II, p. 336.) Donor, Assistant Surgeon J. Theodore Calhoun, U. S. A.

20. (1926.) A portion of the omentum magnum, in the folds of which is lodged a conoidal bullet, which entered the left loin below the twelfth rib, traversed the abdominal muscles to the right side, whence it probably ulcerated through the abdominal wall into the cavity. The patient, a soldier, wounded at Antietam, survived the injury six weeks. (See *Cat.* 1866, p. 490, and *Med. and Surg. Hist.*, Part II, Vol. II, p. 174.) Donor, Dr. W. W. Keen, Jr.

21. (7304.) The third, fourth and fifth lumbar vertebra with a conoidal ball lodged with its apex forward and downward in a depression of the posterior part of the body and the anterior part of the left lamina of the fifth vertebra, having apparently entered through the intervertebral foramen of the fourth and fifth. Death occurred 18 years after injury. Donor, Dr. J. O. Stanton.

22. (9246.) Adjoining horizontal halves of first and second dorsal vertebra; a knife-blade has perforated the left lamina of the upper vertebra and passed forward through the spinal canal as far as the body of the vertebra, dividing the cord. Death from tetanus on the 27th day. Donor, Acting Assistant Surgeon F. A. Atkins.

### III.—ILLUSTRATIONS OF VESICAL CALCULI.

1. (6203.) Vesical concretion, weighing 580 grains (Troy,) consisting of a pistol-ball enveloped in triple phosphates, removed by lateral lithotomy, by Professor H. McGuire, from a man, aged about 40 years, who received an accidental shot penetration of the bladder in 1867, and was successfully operated on in December, 1870. (See *Virginia Clinical Record*, 1871, Vol. I, p. 46; *Med. and Surg. Hist.*, Part II, Vol. II, p. 275; *Virginia Med. Monthly*, 1875, Vol. I, p. 543.) Donated by the operator.

2. **5931.** Vesical calculus having an iron arrow-head as a nucleus. The concretion weighs 857 grains (Troy.) It was successfully removed by lateral lithotomy by Assistant Surgeon W. H. Forwood, U. S. A., at Fort Sill, August 23, 1869, from Satamore, a Kiowa chief, aged 42 years, wounded through the right sciatic notch, near Fort Larned, in 1862, in a fight with Pawnees. (See *Circular No. 3*, S. G. O., 1871, p. 260; *Med. and Surg. Hist.*, Part II, Vol. II, p. 276.) Donor, Dr. W. H. Forwood.

3. **(4846.)** A mulberry calculus, weighing 1,191.6 grains, successfully removed by lateral lithotomy, August, 1867, by Dr. N. S. Lincoln, in the case of a man of 50 years. (*Richmond and Louisville Med. Jour.*, 1869, Vol. VII, p. 423.) Contributed by the operator.

4. **(4846.)** A large, nearly globular, urinary calculus, weighing 2,515 grains, removed by lithotomy, by Dr. J. G. F. Holston. Obtained by exchange from the National Medical College.

#### IV.—ILLUSTRATIONS OF INJURIES OF UPPER EXTREMITIES.

1. **(3161.)** Head of left humerus excised on account of penetration by a musket-ball, which is impacted. (See *Cat.* 1866, p. 104; *Med. and Surg. Hist.*, Part II, Vol. II, p. 573.)

2. **(4343.)** A segment of the head of the right humerus shattered by shot and secondarily excised, with a good result, showing that such partial excisions are not invariably disadvantageous. (See *Cat.* 1866, p. 97; *Med. and Surg. Hist.*, Part II, Vol. III, p. 527.) Donor, Surgeon R. B. Bontecon, U. S. V.

3. **(1118.)** Upper extremity of right humerus, shattered by a ball and excised intermediarily by Assistant Surgeon C. A. McCall, U. S. A. Case of Private E. H. Woods, 6th Maine, wounded at Chancellorsville May 3, 1863. He was fitted with an apparatus by Dr. E. D. Hudson, who reported, in 1865, that the diaphysis had been partially reproduced. (See *Cat.* 1866, p. 109; *Med. and Surg. Hist.*, Part II, Vol. II, p. 580.) Contributed by the operator.

4. **(734.)** The left elbow joint, excised by Surgeon I. Moses, U. S. V., for a shot fracture of the inner condyle of the humerus. The patient recovered, and was pensioned. (See *Cat.* 1866, p. 161; *Med. and Surg. Hist.*, Part II, Vol. II, p. 890.) Contributed by the operator.

5. **(4249.)** The tip of the olecranon and three inches of the lower extremity of the left humerus, successfully excised by Assistant Surgeon A. W. Campbell, 11th New York Cavalry, for compound fracture caused by a fall from a horse. (See *Cat.* 1866, p. 159.) Donor, Dr. M. D. Benedict.

6. **(531.)** The right radius, showing a simple consolidated fracture with slight angular displacement, without shortening. This specimen, which is more than two hundred years old, was picked up upon an ancient battlefield on Oahu, Sandwich Islands. (*Cat.* 1866, p. 194.) Donor, Assistant Surgeon W. R. DeWitt, Jr., U. S. V.

## V.—ILLUSTRATIONS OF INJURIES OF THE LOWER EXTREMITIES.

1. (3520.) The upper fifth of the right femur, sawn longitudinally, showing a penetrating fracture of the neck by a pistol ball, which lodged, exposing its surface just within the capsule. The injury resulted in suppurative destruction of the joint. The patient survived the injury two months. (See *Cat.* 1866, p. 235, and *Circ.* No. 2, S. G. O., 1869, p. 114.) Donor, Assistant Surgeon W. Thomson, U. S. A.

2. (86.) The upper third of the right femur, fractured by a conoidal ball, which entered from the front and perforated the bone at the base of the neck, lodging in the great trochanter, and producing a longitudinal fracture extending to the articulation and reaching six inches down the shaft. The patient died twelve days after the injury. (See *Cat.* 1866, p. 236, and *Circ.* No. 2, S. G. O., 1869, p. 81.) Donor, Dr. J. P. Arthur.

The two following preparations illustrate amputation at the hip:

3. (4237.) Upper two-thirds of the right femur, amputated at the hip-joint by Surgeon E. Griswold, U. S. V., April 12, 1865, for an oblique shot fracture at the base of the great trochanter, with a complete longitudinal fracture extending eight inches down the shaft, in the case of a soldier of the 2d New York Mounted Rifles, aged 17, wounded March 31, 1865. The patient survived the operation less than an hour. (*Circ.* 6, 1865, pp. 50 and 72; *Cat.* 1866, p. 248; *Circ.* 7, 1867, p. 39.) Donor, Surgeon E. Griswold, U. S. V.

4. (4386.) The left femur amputated at the hip-joint by Surgeon E. Bentley, U. S. V., from complications resulting from an imperfectly united shot fracture at the junction of the upper thirds, in the case of Private G. W. L——, 6th Maryland, aged 30, wounded May 5, 1864, and amputated October 12, 1865. The patient recovered and was pensioned. (*Cat.* 1866, p. 248; *Circ.* 7, 1867, p. 42.) Donor, Surgeon E. Bentley, U. S. V.

5. (3881-'82.) Specimens representing united shot fractures in both thigh-bones. The right femur united, two inches shortened, after fracture in the upper third. The left with two and a half inches shortening and angular deformity. The patient survived these injuries seven months and thirteen days. (*Cat.* 1866, pp. 265, 279.) Donor, Acting Assistant Surgeon G. M. Paullin.

6. (3394.) Upper portion of the left femur, badly comminuted by shot below the trochanters and united with displacement and profuse deposit of callus. A number of large fragments preserved their life, to connect the broken shaft. From a soldier in a Nashville hospital. (*Cat.* 1866, p. 281.) Donor, Assistant Surgeon C. C. Byrne, U. S. A.

7. (4201.) Upper half of the left femur contused by shot at the junction of the upper third. An exfoliation at the seat of injury is nearly separated;

the posterior surface is eroded. The patient, a soldier of the 191st Pennsylvania, aged 30 years, survived the injury forty-seven days. (*Cat.* 1866, p. 258.) Donor, Assistant Surgeon W. F. Norris, U. S. A.

8. (3540.) Upper third of the left femur, longitudinally bisected, with an impacted pistol ball in the base of the neck. The patient survived the injury seventy-two days. (*Cat.* 1866, p. 260 *Circular* 2, 1869, p. 71.) Donor, Assistant Surgeon W. Thompson, U. S. A.

9. (1907.) The left femur comminuted in the centre of the shaft by a conical ball, which previously passed through the right thigh, and is attached to the specimen much flattened. The patient survived the injury sixteen days. (*Cat.* 1866, p. 267; *Circular* 6, S. G. O., 1865, p. 33.) Donor, Acting Assistant Surgeon J. Cass.

10. (1354.) The left femur, firmly united, with an inch shortening and slight lateral deformity, after a fracture in the middle third by a conoidal ball. The large fragments that were split off occupy the place of splints held by the callus. The point of fracture shows portions of dead bone not yet thrown off. The patient, Private J. W——, 21st Georgia, aged 38, wounded at Fort Steadman March 25, 1865, survived the injury one hundred and eighty-two days. Dr. G. K. Smith, who treated the case at Armory Square Hospital, regarded it as an example of recovery, and the patient was photographed five months after the injury at the Museum. (*Surg. Series of Phot.*, S. G. O., Vol. II, p. 42; see also *Cat.* 1866, p. 270.) Donor, Assistant Surgeon W. F. Norris, U. S. A.

11. (2182.) The left femur, fractured at the junction of the middle and lower thirds by a conical ball. The displaced fractured ends of the shaft have been connected by arches of callus. From a soldier of a Kentucky regiment, who survived the injury forty-nine days. (*Cat.* 1866, p. 270.) Donor, Acting Assistant Surgeon R. T. Higgins.

The next series illustrates primary or ulterior lesions in the shaft of the femur, amputated for shot injury:

12. (4120.) The lower half of the right femur, amputated primarily by Surgeon D. S. Hays, 110 Pennsylvania, for a severe shot comminution by a conical ball, which has flattened in a mushroom shape against the anterior surface of the lower third. The patient, a soldier of the 73d New York, aged 46 years, wounded September 11, 1864, recovered and was pensioned. (*Cat.* 1836, p. 256.) Contributed by the operator.

13. (1413.) The lower half of the right femur, amputated for a transverse shot fracture in the middle third by a conical ball, which is attached, flattened. A very small portion of the laminated structure is wanting at the point of impact on the outer surface, and directly opposite a longitudinal fissure extends into both fragments. (*Cat.* 1866, p. 225.) Donor, Surgeon C. S. Wood, 66th New York.

14. (2039.) Lower half of the left femur, amputated five days after injury, by Surgeon J. Aiken, 71st Pennsylvania, for a shot comminution in the middle third by a conical ball, which is attached. The patient, Private P. M——, 39th N. Y., wounded February 6, 1864, is a pensioner. (*Cat.* 1866, p. 256.) Contributed by the operator.

15. (30.) Lower half of the right femur, amputated a fortnight after shot fracture in the middle third, by Assistant Surgeon J. S. Billings, U. S. A. The patient, a soldier, wounded at Williamsburg May 5, 1862, recovered. (*Cat.* 1866, p. 285.) Contributed by the operator.

16. (3875.) Portion of the left femur, amputated one month after injury in the upper third, by Assistant Surgeon R. F. Weir, U. S. A., for shot comminution in the middle third with a very oblique fracture. The patient, Private J. F——, 1st N. Y. Cavalry, aged 21, was wounded July 7, 1865, and died twelve days after the operation. (*Cat.* 1866, p. 289.) Donor, Acting Assistant Surgeon J. H. Bartholf.

17. (4067.) Greater portion of the shaft of the right femur, amputated in the upper third nine days after injury, by Surgeon N. R. Moseley, U. S. V., for a shot fracture in the middle third, with extensive longitudinal fissures, by a conical ball, which is attached, flattened. The patient, a soldier, of the 198th Pennsylvania, aged 20, survived the operation six days. (*Cat.* 1866, p. 288.) Contributed by the operator.

The next series illustrates necrosed sequestræ frequently found after amputation :

18. (107.) A cylindrical sequestrum two and a half inches long from a stump of the left femur, amputated in the middle third for shot comminution of the lower third (*Spec.* 3734, *Surg. Sect.* A. M. M.) by Acting Assistant Surgeon E. G. Waters. The patient, Sergeant E. U——, 15th New Jersey, was wounded October 19, 1864, at Cedar Creek, and amputated November 14, 1864. March 8, 1865, the sequestrum was removed by Acting Assistant Surgeon B. B. Miles. Exarticulation at the hip was successfully performed by Dr. T. G. Morton, February 17, 1866. (See *Circ.* 7, S. G. O., 1867, p. 51; *Cat.* 1866, p. 305; *Am. Jour. Med. Sci.*, 1866, Vol. LII, p. 17.) Donor, Dr. B. B. Miles.

19. (4281.) A sequestrum of eight inches, removed from the stump of the left femur three months after primary amputation for shot injury. The patient, a soldier of the 6th N. Y. Cavalry, aged 23, wounded and amputated May 7, 1864, recovered. (*Cat.* 1866, p. 309.) Donor, Assistant Surgeon W. Thomson, U. S. A.

20. (171.) A sequestrum, eight and a half inches long, removed from the stump of the left femur, two months after intermediary amputation in the lower third for shot injury. The patient, a corporal of the 64th New York, aged 30, wounded at Hatcher's Run, March 25, 1865, recovered. (*Cat.* 1866, p. 309.) Donor, Assistant Surgeon H. Allen, U. S. A.

Illustrations of shot injuries of the knee from the following series:

21. (3269.) Bones of the right knee, after amputation in the lower third of the thigh, by Surgeon N. R. Moseley, U. S. V., for shot fracture of the tibia and fibula, in a case in which Dr. W. H. Ensign had excised the upper portion of the fibula for gangrene and hemorrhage. The patient, a private of the 170th New York, aged 44, (wounded August 25th, excised September 12th, amputated September 18th, 1864.) survived the amputation three days. (*Cat.* 1866, p. 381.) Donor, Dr. H. G. Bates.

22. (4135.) The upper extremity of the bones of the left leg, fractured by a conoidal ball which perforated from within and below, splintering the head of the tibia and resting on the articulation. The patient, Private T. J. T., 57th Massachusetts, was wounded March 25th, amputated March 30th, and discharged on October 30, 1865, and furnished with an artificial limb. (*Cat.* 1866, p. 319.) Donor, Surgeon W. O. McDonald, U. S. V.

23. (1882.) The bones of the right knee, amputated in the lower third of the femur by Surgeon A. N. Dougherty, U. S. V., in the case of Private W. G. M——, 4th Ohio, wounded at Mine Run, November 27, amputated December 3, 1863, for a shot fracture of the outer condyle and the head of the tibia. A conoidal ball, compressed upon itself, is lodged in the latter bone. The patient is a pensioner. (*Cat.* 1866, 348.) Donor, Surgeon J. Dwinelle, 106th Pennsylvania.

24. (2276.) The bones of the left knee, amputated in the lowest third of the thigh for fracture of the internal condyle of the femur and of the head of the tibia by a conoidal ball, which is impacted in the latter. The patient, Private L. R——, 23d North Carolina, aged 34, wounded at Spottsylvania May 12, was amputated May 14, 1864, and died of pyæmia eleven days after the operation. (*Cat.* 1866, p. 345.) Donor, Surgeon O. A. Judson, U. S. V.

25. (6812.) The bones of the left knee, showing a bullet imbedded in the femur between the condyles. The patient died of pneumonia over fifteen years after the injury, the foreign body having remained in the bone apparently innocuously during all these years, allowing the patient to walk without the least sign of lameness. Donor, Dr. J. Foster Bush.

### Shot injuries of the bones of the leg:

26. (4387.) The right tibia and fibula, from a case of amputation in the lower third of the thigh six months after shot fracture in the leg. Tolerable union has occurred in the fibula. The tibia is partly united, is carious at the point of fracture, and has a very large and complete foliaceous deposit throughout its greatest length. The patient, a sergeant of the 2d Maryland, aged 24, was wounded April 2, and amputated October 14, 1865, and recovered. (*Cat.* 1866, p. 392.) Donor, Surgeon E. Bentley, U. S. V.

27. (38.) The lower halves of the bones of the right leg, with the fibula transversely fractured and the tibia shattered by a round ball, which lodged about 3 inches above the ankle-joint. Three portions of the tibia and fibula below the fractures are connected by bony union. Donor, Assistant Surgeon J. B. Brinton, U. S. A.

28. (2778.) Upper portions of the tibia and fibula of the right leg, with hyperostosis of the distal extremities of both bones. From a soldier of the 51st Pennsylvania, wounded at White Oak Swamp June 30, 1862. (See *Cat.* 1866, p. 400.) Donor, Dr. T. G. Morton.

29. (1956.) Head of left tibia and condyles of the femur, excised five months after fracture by a spherical ball, which is lodged in the inner condyle. The patient died from pyæmia twenty-two days after the operation. (*Circ.* No. 6, S. G. O., 1865, p. 59; *Cat.* 1866, p. 335.) Contributed by the operator, Dr. F. Hinkle.

### Shot injuries of the ankle:

30. (3607.) Bones of right ankle, amputated thirteen and a half months after injury by a ball which entered six inches above the ankle-joint and escaped at the point of the heel. The patient, a private of the 44th Ohio, wounded at Missionary Ridge, recovered. (*Cat.* 1866, p. 435.) Donor, Assistant Surgeon G. M. Sternberge, U. S. A.

31. (3356.) Ligamentous preparation of the right tarsus and metatarsus, one month after injury, with a conoidal ball lodged in the carious astragalus. Case of Private C. H., 33d Massachusetts, wounded at Dallas May 25, 1864. Amputated June 26, 1864. (*Cat.* 1866, p. 428.) Donor, Dr. L. B. McNabb.

32. (2783.) Portions of the right tibia, fibula, astragalus, and calcaneum, from a successful Pirogoff's amputation. From Private O. C——, 17th Wisconsin, wounded at Gettysburg July 1, 1863. (*Cat.* 1866, p. 422.) Contributed by the operator, Acting Assistant Surgeon A. Hewson.

33. (4543.) The left astragalus and lower borders of the tibia and fibula, from a soldier shot through the ankle at Fredericksburg December 12, 1862, and amputated by a modification of Syme's method.

## VI.—ILLUSTRATION OF VARIOUS DISEASES.

There are four (4) specimens illustrating the lesions in enteric fever: one, of thickening of Peyer's patches; a second, showing thickening with ulceration; a third, in which perforation has occurred; and a fourth, where the ulcerated patch has cicatrized.

1. (7727.) Portion of ileum with thickened Peyer's patches: its solitary follicles enlarged to polypoid tumors the size of small shot. From a soldier

who died in Lincoln Hospital, Washington, D. C., of a fever diagnosed "typhus." Contributed by Surgeon J. H. Bryant, U. S. Vols.

2. (8263.) A portion of ileum with Peyer's patches much thickened and ulcerated. The solitary follicles are enlarged to rounded tumors nearly the size of peas, many of them ulcerated at the apices; the villi are hypertrophied. The solitary follicles throughout the whole colon were enlarged to tumors the size of peas; their apices ulcerated. From a soldier of the 12th U. S. Infantry, age 25, who died of typhoid fever. Contributed by Assistant Surgeon W. Thomson, U. S. A.

3. (7926.) Portion of ileum, taken several feet above the ileo-caecal valve, with two ulcerated Peyer's patches, which present a peculiar cribriform appearance. Near the bottom of piece is a deep oval ulcer, the long diameter of which is transverse to the gut. At the bottom of this ulcer are two oval perforations a short distance apart. The peritoneal surface of the piece is coated with a thin film of pseudo-membrane; some of the solitary follicles are ulcerated. The small intestines elsewhere presented several other perforations. The patient had contracted fever before Petersburg, Virginia. Contributed by Surgeon W. L. Faxon, U. S. Vols.

4. (7958.) From near the middle of the ileum showing pin-head enlargement of solitary follicles, with adherent shreds of pseudo-membrane and a large oval cicatrix, corresponding in situation with a Peyer's patch. The ileum presented a number of such cicatrices. The colon showed many follicular ulcers, with a few adherent shreds of pseudo-membrane. From a patient who recovered from typhoid fever and subsequently died of chronic diarrhoea. Contributed by Acting Assistant Surgeon H. C. May.

The next two specimens are examples of follicular ulceration of the colon. In chronic catarrhal inflammation the enlarged solitary follicles of the small intestine long abide as little tumors; but those of the colon speedily pass into ulceration, and the follicular ulceration is usually associated with inflammatory thickening of the submucosa. In such cases tenesmus is sometimes present, sometimes absent: and they are spoken of as dysentery by some surgeons, as diarrhoea by others. Pseudo-membranous inflammation of the mucous surface between the ulcers is apt to supervene in these cases, and this lesion is very generally found when acute dysenteric symptoms precede the fatal termination of a chronic flux. This complication exists in a number of the specimens in the Museum. Follicular ulcers can generally be distinguished from the ulcers of diphtheritic dysen-

tery by their form; but in the extensive ulcerations found in some chronic cases it is sometimes difficult to be sure which process has produced the destruction of tissue observed.

5. (7909.) Portion of colon taken near the sigmoid flexure, the mucous membrane thickened, and present minute follicular ulcers and pseudo-membranous frosting. From a soldier of the 8th New York Heavy Artillery, who died of chronic diarrhœa. Contributed by Acting Assistant Surgeon R. B. Hitz.

6. (7664.) Portion of descending colon, its mucous membrane much thickened and presenting numerous well-marked follicular ulcers. From a soldier of the 23d New Jersey who had been sick for two months with fever and diarrhœa. The descending colon and sigmoid flexure were as in the specimen; Peyer's patches were also thickened. Contributed by Assistant Surgeon E. J. Marsh, U. S. A.

The next two specimens are illustrative of the morbid processes of diphtheric dysentery. The characteristic lesions are pseudo-membranous deposits on the surface of the mucous membrane, involving also the mucosa and submucosa, and giving rise to sloughing, the sloughs invading the tissue of the bowel as deeply as the pseudo-membranous deposit; the resulting ulcers are usually of considerable size.

7. (7830.) Portion of ascending colon, the mucous membrane of which is thickened, and presents numerous large excavating ulcers occupying a large portion of its surface. Detached shreds of mucous membrane, coated with lymph, hang from the edges of the ulcers. From a soldier of the 2d Battalion Veteran Reserve Corps, who died of dysentery. The colon throughout was in the condition of the specimen. Contributed by Assistant Surgeon H. Allen, U. S. A.

8. (7829.) Fibrinous cast, fourteen inches long from the rectum; composed of ordinary croupous lymph. From a soldier of the 4th California, who died of chronic dysentery, nearly four and a half months after the disease began. The cast was passed on the twenty-first day. Contributed by Surgeon S. S. Todd, of the same regiment.

The next specimen illustrates EPIDEMIC CHOLERA, as it appeared at Fort Riley, Kansas, in the summer of 1867.

9. (8332.) Portion of ileum, the villi hypertrophied, pin-head enlargement of solitary follicles, and Peyer's patches prominent. From a quartermaster's employé, who, after four days of diarrhœa, from which he appeared

to be recovering, was seized with cramps, and died within two hours. Contributed by Surgeon B. J. D. Irwin, U. S. A.

The next specimen shows the manner in which the DIPHThERITIC process extends into the bronchi.

10. (8034.) Portion of lung showing diphtheritic casts in the branches of the bronchial tubes. From a medical officer who died of diphtheria. Contributed by Assistant Surgeon G. M. McGill, U. S. A.

The next two specimens are examples of metastatic foci, quite like those which occur in pyæmia after gunshot wounds, but resulting in these cases from other causes. The point of departure of the metastatic process appears to have been a subcutaneous abscess in No. 78, an ulcerated colon in No. 79, and a collection of pus in the left pleural sac in No. 80.

11. (8255.) Portion of lower lobe left lung containing a number of small pyæmic foci, about the size of peas, from a colored boy, age 13, with scrofulous abscesses in groin and chronic peritonitis. From an autopsy by Dr. S. S. Bond, at Freedman's Hospital, Washington.

12. (7742.) Portion of liver, presenting a number of metastatic foci. From a soldier of the 14th Infantry who had colliquative diarrhoea and general peritonitis. Contributed by Assistant Surgeon E. DeW. Breneman, U. S. A.

The next three specimens are from cases of SCURVY. Nos. 14 and 15 present the typhoid lesion as modified in scorbutic subjects.

13. (7451.) Larynx, posterior third of tongue, half arches, and tonsils; both tonsils the seat of foul, irregular, and gangrenous ulceration. From a patient who died in Marine Hospital, New Orleans, in 1862. One of a number of fatal cases in the same hospital in which gangrenous ulceration of the mouth and throat occurred in debilitated and anæmic (scorbutic) men. Contributed by Acting Assistant Surgeon R. K. Browne.

14. (7537.) Portion of ileum with a sloughing Peyer's patch, remarkable on account of the great size and pultaceous character of its thickening. From a soldier of the 126th New York, in whom the fever supervened upon chronic diarrhoea. The colon was of a dirty slate color, with streaks of inflammation here and there. Pneumonia on the right side. Spleen large and flabby. A number of irregular spots of purpura, from the size of a flea-bite to that of a dime, were observed on the skin, and especially on the thighs. Contributed by Acting Assistant Surgeon Joseph Leidy.

15. (7915.) Lower portion of ileum, with ileo-cæcal valve and part of cæcum, showing three Peyer's patches converted into pultaceous sloughs; the solitary follicles are enlarged; many of them, especially near valve, ulcerated; these ulcers presenting same characters as those of Peyer's patches, but smaller. There are also a number of small sloughing ulcers on the under surface of the valve and in the cæcum. From a soldier who contracted typhoid fever before Petersburg in the fall of 1864. Petechiæ, sudamina, and hæmorrhage from the bowels were prominent symptoms. Contributed by Acting Assistant Surgeon W. C. Miner.

Of the next five specimens four are from a remarkable example of multiple melanotic cancer.

16. (8675.) Portion of parietal bone, showing two carcinomatous tumors. From an old soldier in whom also the liver was cancerous. Contributed by Surgeon C. H. Lamb, U. S. A.

17. (8274.) Spindle-shaped melanotic tumor, five inches long, weighing two and a half ounces, which was situated over the left clavicle and upper portion of the sternum, and probably consists of lymphatic glands.

18. (8276.) Portion of lower lobe of right lung, presenting at its inferior angle a lobulated melanotic mass about the size of a hen's egg.

19. (8277.) Section of liver, presenting several melanotic nodules; the largest over three-fourths of an inch in diameter.

20. (8278.) Portion of pancreas, presenting a number of melanotic nodules, the largest about the size of a pea. From a freedman, age 60, in whom numerous other similar deposits were found. The melanotic masses were soft, and composed for the most part of irregular, more or less polygonal cells about one-thousandth of an inch in diameter, containing large oval nuclei and brownish-black pigment granules. Contributed by Assistant Surgeon E. Bentley, U. S. A.

The next specimen is one of BRONCHOCELE in a child.

21. (8366.) Larynx, portion of trachea, and thyroid gland of a child; the right lobe of the gland is much enlarged, and has undergone cystic degeneration; the left lobe is normal. Contributed by the Medical Faculty of Columbian College, Washington, D. C.

The next is a specimen illustrating Addison's disease.

22. (8740.) Supra-renal capsules, showing cheesy deposits which are most numerous in the right capsule. From a white woman, age 31, in whom the characteristic bronzing of the skin and anemia were well-marked. Cretified tubercles were found in each lung. Contributed by Dr. J. T. Young, Washington.

The next is a specimen of Bright's disease.

23. (8650.) Kidneys from a woman who died in convulsions during labor. The right is quite small, and is a typical, gouty kidney; the left is less marked. Contributed by Dr. J. T. Young, Washington.

The next is a specimen illustrating TUBERCULOSIS.

24. (7745.) Spleen, studded with small tubercles, from a soldier of the 145th Pennsylvania, age 29, who died of chronic diarrhœa. There were tubercles in both lungs, and the mucous membrane of the colon was ulcerated. Contributed by Surgeon E. Bentley, U. S. Vols.

The next two specimens are of ENTOZOA.

25. (7494.) *Tania solium*, about twenty-five feet long, with the head. From a soldier of the 96th New York, age 29. It was voided after the use of turpentine and castor oil. Contributed by Acting Assistant Surgeon J. F. Kennedy.

26. (8792.) *Echinococcus* cysts from the urinary bladder. From a soldier of the 21st Infantry, age about 40. Similar cysts were found in the right lung and spleen; there were none in the liver; the brain was not examined. Contributed by Assistant Surgeon F. C. Ainsworth, U. S. A.

The next specimen illustrates the fatality of even small ANEURISMS of the aorta.

27. (8006.) Small aneurism of aorta, just above semilunar valves; the sac, which is about the size of a walnut, has ulcerated through into the pulmonary artery and the pericardium. From a soldier of the 1st Maryland Veterans, age 22, who was apparently in good health, and doing guard duty, when he suddenly fell insensible, and expired in a few moments. The pericardium was found distended with blood escaped from the ruptured aneurism. Contributed by Assistant Surgeon A. Ansell, 1st Maryland Veterans.

The next specimen is one of LARYNGITIS.

28. (8100.) Larynx and part of trachea, showing great thickening of the epiglottis, an incision into which discovered it to be infiltrated with pus. From a soldier of the 2d Arkansas Cavalry, age 26, who died of acute laryngitis. Contributed by Surgeon Wm. Watson, U. S. Volunteers.

The next specimen illustrates the constriction resulting from caustics applied to mucous canal.

29. (9067.) Alimentary canal of child from tip of tongue to duodenum, showing an inflammatory stricture of œsophagus. From a boy two years

and six months of age, who drank some caustic alkali several months before death. Temporary relief was given by bougies, and nutritive enemata were also used. Contributed by Dr. E. C. Morgan, Washington.

The next specimen illustrates INTUSSUSCEPTION of intestine.

30. (9051.) An intussusception of the ileum into the ascending colon at the ilea-cæcal valve; the invaginated position is much swollen and deformed, and dark-colored, as from incipient gangrene. From a man who presented symptoms of obstruction of the bowel, which was not relieved. Contributed by Dr. T. G. Croft, Aiken, S. C.

The next specimen illustrates an anomaly in number of a viscus.

31. (9103.) Four spleens, each about the size of a walnut, and connected by adhesions. From a negro woman who died suddenly of hemorrhage from the fallopian tube. Contributed by Dr. J. F. Hartigan, Washington, D. C.





The World's Industrial and Cotton Centennial Exposition,  
NEW ORLEANS, LA., 1884-'85.

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Medical Department, United States Army,  
EXHIBIT-CLASS 4.

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No. 6.

DESCRIPTION

OF THE

MICROSCOPES

AND

MICROSCOPICAL PREPARATIONS,

FROM THE ARMY MEDICAL MUSEUM,

WASHINGTON, D. C.

BY

SURGEON JOHN S. BILLINGS, U. S. A.,  
*Curator of the Museum.*

---

HENRY McELDERRY,  
*Assistant Surgeon, U. S. A.,*

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT, U. S. A.

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New Orleans, La., 1884-'85.



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THE microscopes exhibited by the Army Medical Department are part of a collection which has been formed at the Army Medical Museum to illustrate the successive stages of development of the instrument, and of the various appliances connected with it, both optical and mechanical.

The majority of the instruments exhibited are of foreign make, and it is desired to obtain specimens of old instruments from American makers to show what has been done in this direction in this country.

JOHN S. BILLINGS,  
*Surgeon U. S. Army,*  
*Curator Army Medical Museum.*

THE WORLD'S  
INDUSTRIAL AND COTTON CENTENNIAL EXPOSITION,  
NEW ORLEANS, LA., 1884-'85.

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DESCRIPTION OF THE MICROSCOPES,

FROM THE

Army Medical Museum, Washington, D. C.

BY

SURGEON JOHN S. BILLINGS, U. S. A.,

CURATOR OF MUSEUM.

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MICROSCOPES FROM THE ARMY MEDICAL  
MUSEUM.

Spec. 99. Misc. Sect.

Large old "Andrew Ross & Co." with fine adjustment acting at back of limb. Hinged heel piece to foot. Polarizer screwing on bent arm sliding on tail-piece. Analyzer fitting over eye-piece; dark well on stem fitting on bent arm on tail-piece; disk of diaphragms fitting beneath stage with short cylindrical tube.

Spec. 100. Misc. Sect.

Large old "Andrew Ross & Co." Body-tube worked by rack on limb extending nearly the whole length at the back, (since called the Jackson model, focusing in front of body-tube at nose-piece, (since termed "Smith and Peck's fine adjustment,) double nose-piece (straight) [probably a later addition, as it is engraved "Ross, London," ? T. Ross.] Achromatic condenser with centering screws (4) and rack

work, fitting beneath stage by three projections corresponding to slots in the flange of condenser. Polarizer, (fitting similarly); analyzer, [“body prism” in separate brass box,] fitting in adapter at lower end of draw tube. Optical part of achromatic condenser in similar separate box engraved A, eye-piece.

Spec. 101. Misc. Sect.

Smaller “Andrew Ross & Co.,” No. 65. Early type of Ross continued by Ross till after the death of T. Ross [the son of Andrew]. A, eye-piece, disc of diaphragms sliding in movable plate beneath stage, straight arm sliding on tail-piece to carry dark wells; two dark wells (one with cork); polarizer fitting beneath stage in moving plate; analyzer fits over eye-piece.

Spec. 102. Misc. Sect.

Old compound microscope by “J. Cuff,” (middle of last century); sliding Lieberkühn, stage forceps, mirror, six lenses, eye-piece screws in, fish plate, animalcule cage, black and white disk, glass cell (broken), two diaphragms for mirror.

Spec. 103. Misc. Sect.

“Chevalier’s Microscope Universel,” with four eye-pieces, screws on box, and packs in drawer: this model has found much favor in the large laboratories on the continent, and is seldom met with—nearly all that Charles Chevalier made went into public institutions.

Spec. 104. Misc. Sect.

Microscope by Carpenter & Westley. (Very early model issued by the firm, say fifty years ago). Rack moving stage (coarse adjustment), fine adjustment top of limb as in Oberhäuser’s, &c., one eye-piece, disk of diaphragms, spring stage, stage condenser.

Spec. 105. Misc. Sect.

Ellis’ aquatic microscope with Wilson’s (*vide* “Adams”)

combined. (Middle of last century). Two Lieberkuhn's, three simple lenses, trough, three slides of objects, box of talc covers, part of stage forceps.

Spec. 106. Misc. Sect.

Jones' improved aquatic microscope. Two Lieberkuhn's, three simple lenses, cloth-covered stage and ordinary stage; animalculi trough.

Spec. 107. Misc. Sect.

Brock's portable compound microscope, with four lenses screwed on base.

Spec. 108. Misc. Sect.

Very old solar microscope, with heliostat mirror and Wilson's "simple," with six powers, (probably dating soon after 1740, when G. Adams brought out his "solar microscope.") plane glass and long focus lens fitting in heliostat (for experiments on light), troughs, with four concave cells, two milled head-screws, and two plates for attaching heliostat.

Spec. 109. Misc. Sect.

Jones' solar microscope, [very good example.] (*vide* "Adams.") with sliding lens, Nos. 1, 2, 3, and 4, and long slide of 6 lenses, forceps, and two milled head-screws, and two plates for attaching heliostat.

Spec. 110. Misc. Sect.

Jones' small portable botanical microscope in case with fine adjustment at back, one Lieberkuhn's, one high power, three lateral swinging lenses in cells, live box, stage forceps, three slides of objects.

Spec. 111. Misc. Sect.

Harris' portable "opaque microscope in case," three Lieberkuhn's, with lenses, one simple lens, forceps, trough, object holders, (made about 1820).

## Spec. 112. Misc. Sect.

Old compound microscope, by Dollond, with rotating disk of lenses at nose-piece, disk of diaphragms, folding feet; (compound eye lens to eye-piece,) live box, mirror with plastic plane, (last century or early in this).

## Spec. 113. Misc. Sect.

Very old "Dellebarre," simple and compound (very complete), two Lieberkuhn's, with lenses, six lenses, spring stage, fish plate, trough, stage forceps, forceps, four slides of objects, screw for fixing microscope on tree, &c., box of talc covers, carrier for compound body, do., for simple lenses, two diaphragms, flat and concave glass stop plates.

## Spec. 114. Misc. Sect.

Copy of Janssen's Magdeburg.

## Spec. 115. Misc. Sect.

Abraham's achromatic prism.

## Spec. 116. Misc. Sect.

Baker's traveling microscope devised by Mr. Moginie.

## Spec. 117. Misc. Sect.

Microscope of J. L. Reddell, Professor of Chemistry in the University of Louisiana, binocular microscope in which, "behind the objective, and as near thereto as practicable, the light is equally divided and bent at right angles, and made to travel in opposite directions by means of two rectangular prisms," made in 1852 by Grunow Brothers, New Haven, Connecticut.

## Spec. 118. Misc. Sect.

Binocular inverted microscope of J. and W. Grunow, New York.

## Spec. 119. Misc. Sect.

New student microscope of Joseph Zentmayer, Phila., for use of visitors in examining microscopical preparations.

## Spec. 120. Misc. Sect.

Large monocular microscope of Joseph Zentmayer, Phila., for use of visitors in examining microscopical preparations.

## Spec. 121. Misc. Sect.

Gilbert & Sons' microscope. Sold by E. and W. Smith & Co., Liverpool.

## Spec. 122. Misc. Sect.

Nachet's chemical microscope (inverted), constructed by Nachet et Fils, Paris, on the plan devised by Dr. J. Lawrence Smith, of Louisiana, for the purpose of reviewing objects from their *under* side when heat or re-agents are applied to them.



THE WORLD'S  
Industrial and Cotton Centennial Exposition,

NEW ORLEANS, LA., 1884-'85.

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LIST OF MICROSCOPICAL PREPARATIONS,

FROM

ARMY MEDICAL MUSEUM.

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The microscopic slides exhibited are samples of the extensive series of preparations contained in the microscopical section of the Museum, which series now contains 8,859 slides.

JOHN S. BILLINGS,  
*Surgeon U. S. Army,*  
*Curator Army Medical Museum.*

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NOTE.—Medical men acquainted with the use of the microscope, who desire to examine these microscopical preparations, will have every facility extended on application to the medical officer in charge of the Medical Exhibit, U. S. A., Dr. Henry McElderry, U. S. A.

# LIST OF MICROSCOPICAL PREPARATIONS.

## HISTOLOGICAL.

- 1 (No. —, Mic. Sec.) Brain of rabbit (injected).
- 2 ( " 8749, " " ) Olivary body, human (double stained).
- 3 ( " 7336, " " ) Medulla oblongata, human (trans. sect.).
- 4 ( " 7392, " " ) Nerve cells in spinal cord (trans. sect.).
- 5 ( " 1214, " " ) Nerve cells, spinal cord of calf.
- 6 ( " —, " " ) Retina, human (hæmatoxylon stained).
- 7 ( " —, " " ) Retina, human (macula lutea).
- 8 ( " —, " " ) Semilunar ganglion, human.
- 9 ( " 5896, " " ) Cornea of frog, (stained chloride of gold).
- 10 ( " —, " " ) Tongue of rabbit (injected).
- 11 ( " 8047, " " ) Trachea, human.
- 12 ( " 395, " " ) Section of fang of incisor tooth (longitudinal).
- 13 ( " 396, " " ) Section of fang of incisor tooth (longitudinal).
- 14 ( " 397, " " ) Section of incisor tooth (longitudinal).
- 15 ( " 398, " " ) Section of molar tooth (longitudinal).
- 16 ( " 7346, " " ) Mammary gland, human (trans. sect.).
- 17 ( " 8841, " " ) Submaxillary gland of rabbit.
- 18 ( " 8840, " " ) Liver of amphiuma.
- 19 ( " —, " " ) Small intestine of turtle (trans. sect.).
- 20 ( " —, " " ) " " " "
- 21 ( " 7367, " " ) " " rabbit, ilium, mucous membrane.

- 22 (No. 4769, Mic. Sec.) Muscle of rat (injected).  
 23 ( " 7381, " " ) Muscular fibre, man.  
 24 ( " 7386, " " ) Costal cartilage, man.  
 25 ( " 922, " " ) Cartilage, rib of calf.  
 26 ( " 7383, " " ) Tendon, man.  
 27 ( " 7380, " " ) Elastic tissue, cow.  
 28 ( " 7379, " " ) Connective tissue, man.  
 29 ( " 7378, " " ) Adipose " "  
 30 ( " —, " " ) Chicken embryos, 36 hours old  
 (heads).  
 31 ( " 7206, " " ) Placenta, 4 mos.  
 32 ( " 8843, " " ) Orchis epididymis, rat.  
 33 ( " 7348, " " ) Testicle of child (trans. sect.).  
 34 ( " 7374, " " ) Penis of monkey "  
 35 ( " 8016, " " ) Prostate gland (enlarged).  
 36 ( " 8839, " " ) Ovary and tube from girl aged 14  
 years.  
 37 ( " —, " " ) Supra-renal capsule of rabbit.  
 38 ( " —, " " ) " " " human.  
 39 ( " 4789, " " ) Kidney of dog (injected).  
 40 ( " 4922, " " ) " rat "  
 41 ( " —, " " ) Bladder of frog (nit. silver injection).

## PATHOLOGICAL.

- 42 ( " 8609, " " ) Tubercle of lung (Guiteau).  
 43 ( " 7524, " " ) " small intestine (tran. st.).  
 44 ( " 7528, " " ) " " " (long. sect.).  
 45 ( " 7531, " " ) " " " "  
 46 ( " 7538, " " ) " " " "  
 47 ( " 7900, " " ) " " "  
 48 ( " 7864, " " ) Nailer's phthisis.  
 49 ( " 8654, " " ) Syphilitic nodule in lung.

- 50 (No. 7578, Mic. Sec.) Hepatized lung.  
 51 ( " —, " " ) " "  
 52 ( " —, " " ) Apoplectic lung.  
 53 ( " 7770, " " ) Cirrhosis of liver of cat.  
 54 ( " —, " " ) Fatty liver.  
 55 ( " 6530, " " ) " "  
 56 ( " —, " " ) Nutmeg liver.  
 57 ( " 8701, " " ) Amyloid liver.  
 58 ( " 7892, " " ) Abscess of liver.  
 59 ( " —, " " ) Amyloid degeneration with inter-  
 stitial nephritis.  
 60 ( " 8789, " " ) Kidney, Bright's disease.  
 61 ( " 7546, " " ) Discoloration of skin, Addison's dis-  
 ease.  
 62 ( " 8641, " " ) Atheroma of aorta.  
 63 ( " 7411, " " ) Cerebral artery, organizing throm-  
 bus, man.  
 64 ( " 8834, " " ) Atrophy of cerebellum, acute mania.  
 65 ( " —, " " ) Cerebrum (Guiteau).  
 66 ( " 7289, " " ) Colon in dysentery.  
 67 ( " 7220, " " ) " "  
 68 ( " 7253, " " ) " "  
 69 ( " 7266, " " ) " "  
 70 ( " 7284, " " ) " "  
 71 ( " 7254, " " ) Ilium "  
 72 ( " 7457, " " ) Enlarged Peyer's patch.  
 73 ( " 7453, " " ) " solitary gland.

## TUMORS.

- 74 ( " 7100, " " ) Colloid cancer of omentum.  
 75 ( " 8564, " " ) Medullary cancer of breast.  
 76 ( " 2390, " " ) Cancer of liver.

- 77 (No. 4037, Mic. Sec.) Cancer of gall duct.
- 78 ( " ———, " " ) Colloid cancer of stomach.
- 79 ( " 4293, " " ) Cancer of pylorus.
- 80 ( " 4717, " " ) " "
- 81 ( " 5689, " " ) " breast.
- 82 ( " 6557, " " ) " "
- 83 ( " 8603, " " ) Cancerous nodule from peritoneal surface of small intestine.
- 84 ( " 8688, " " ) Cancer of spleen.
- 85 ( " 8634, " " ) Villous cancer of bladder.
- 86 ( " 8808, " " ) Melanotic cancer of liver.
- 87 ( " 8565, " " ) Medullary " breast.
- 88 ( " 8414, " " ) Cancer of liver.
- 89 ( " 5756, " " ) Muscle in vicinity of mammary cancer.
- 90 ( " ———, " " ) Epithelioma of lachrymal gland.
- 91 ( " 6980, " " ) " of foot.
- 92 ( " 5869, " " ) " of labium and perineum.
- 93 ( " 3723, " " ) Epithelioma of lower lip (recurring).
- 94 ( " 6354, " " ) " of leg.
- 95 ( " 6358, " " ) " "
- 96 ( " 8552, " " ) Glioma of brain.
- 97 ( " 8361, " " ) Psammoma of choroid plexus.
- 98 ( " 7775, " " ) Sarcoma of eye.
- 99 ( " 8836, " " ) Large spindle-celled melano-sarcoma from large toe.
- 100 ( " 6128, " " ) Melanoma from back.
- 101 ( " 8759, " " ) Tubular adenoma of breast.
- 102 ( " 6524, " " ) Adenoma of breast.
- 103 ( " 7916, " " ) " "
- 104 ( " 3885, " " ) Condyloma.

- 105 (No. 7135, Mic. Sec.) Papilloma from uvula.  
 106 ( " —, " " ) " " penis.  
 107 ( " 8614, " " ) Polypus from uterus of child.  
 108 ( " 8838, " " ) " recti.  
 109 ( " —, " " ) Myoma of uterus.  
 110 ( " 5555, " " ) Ovarian tumor.  
 111 ( " 2448, " " ) " cyst (shows bone, cartilage, etc.).  
 112 ( " 8533, " " ) Tumor from œsophagus (myoma).  
 113 ( " 6464, " " ) " " parotid.  
 114 ( " 3872, " " ) " " ear.  
 115 ( " 6932, " " ) Goitre.

## BOTANICAL.

- 116 ( " 6591, " " ) Nettle leaf, glandular hairs.  
 117 ( " 6584, " " ) Saxifraga sarmentosa, stomata in clusters.  
 118 ( " 6583, " " ) Sanguinaria canadensis, leaf, parenchymal cells.  
 119 ( " 6597, " " ) Annular and spiral deposit from root of opuntia vulgaris.  
 120 ( " 6578, " " ) Aspidium marginale, stomata.  
 121 ( " 6581, " " ) Leaf of galium asprellum.  
 122 ( " 7750, " " ) Deutzia crenata.

## DIATOMS.

- 123 ( " —, " " ) Pleurosigma angulatum.  
 124 ( " —, " " ) Surirella gemma.  
 125 ( " —, " " ) Frustulia saxonica.

## INSECTS.

- 126 ( " —, " " ) Scales of lepisma (new species).  
 127 ( " 5523, " " ) Ovipositor of saw fly.

128 (No. 5522, Mis. Sec.) Head and tongue of house fly.

129 ( " 5511, " " ) Young spider.

#### ENTOZOA, ETC.

130 ( " 6542, " " ) *Trachina spiralis*.

131 ( " 6545, " " ) " "

132 ( " 1675, " " ) Head of *tænia*.

#### BACTERIA.

133 ( " 8829, " " ) *Bacillus tuberculosis* (sputum.)

134 ( " 8444, " " ) " anthracis in lung.

135 ( " 8452, " " ) " " (blood.)

#### FIBRES.

136 ( " 1888, " " ) Flax fibre.

137 ( " 1892, " " ) Silk fibre.

138 ( " 6226, " " ) Cotton fibre.

#### HAIRS.

139 ( " 7505, " " ) Hair of sheep.

140 ( " 7515, " " ) " lamb.

141 ( " 7504, " " ) " cow.

142 ( " 7517, " " ) " calf.

143 ( " 7508, " " ) " llama.

144 ( " 7511, " " ) " mixed breed, llama and alpaca.







The World's Industrial and Cotton Centennial Exposition,  
NEW ORLEANS, LA., 1884-85.

---

Medical Department, United States Army

EXHIBIT-CLASS 4.

---

No. 7.

DESCRIPTION

OF THE

COMPOSITE PHOTOGRAPHS OF CRANIA

AND OF

Crania from the Army Medical Museum,

WASHINGTON, D. C.

BY

SURGEON JOHN S. BILLINGS, U. S. A.,

*Curator of the Museum.*

---

HENRY McELDERRY,

*Assistant Surgeon, U. S. A.*

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT U. S. A.

---

New Orleans, La., 1884-85.



The World's Industrial and Cotton Centennial Exposition,  
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New Orleans, La., 1884-85.



**THE WORLD'S**  
**Industrial and Cotton Centennial Exposition,**  
**NEW ORLEANS, LA., 1884-'85.**

**Description of the Composite Photographs of Crania,**  
**and of Crania from the Army Medical Museum.**

BY SURGEON JOHN S. BILLINGS, U. S. A.,

*Curator of the Museum.*

The composite photographs exhibited have been made at the Army Medical Museum, in Washington, to illustrate the application of this process to the study of craniology. The method of composite portraiture, as devised by Mr. Francis Galton, F. R. S., consisted in exposing each of a series of portraits, which had been reduced to the same size, successively before the same sensitive plate for a portion of the time required to make a good picture. The composites here presented are, however, made directly from the crania themselves, and not by combination of separate photographs.

The process may be briefly described as follows: Taking, for example, No. 1, it was found, with the light and exposure on that day, that it required about 490 seconds, with a wet plate, to obtain a good picture of a single skull. Seven adult male Esquimaux skulls were taken at random from the collection; that is, without any attempt to select skulls of same size or general appearance, the only points borne in mind in the selection being that they should be the skulls of adult males. These crania were exposed successively before the same plate for a period of 70 seconds each, that is, one-seventh of the time required for a perfect picture, and the result is a composite picture of the seven crania.

A part of the composites, as indicated in the list, were made by the use of wet plates, the average exposure being about seventy seconds for each of seven crania, or a little over eight minutes in all for the group. The greater part were taken on dry plates, the time of exposure for each cranium being about three seconds. These composites, being only first attempts, are not very satisfactory as photographs, the exposure in most of them having been too long; but they serve to indicate the amount of variation in shape and size which exists in adult crania of the same race and sex, and also to show that this method will afford a means of comparison of the crania of different groups with reference to the question as to how far distinctions of race are indicated by cranial variations.

How far this can be done may be seen, for example, by a comparison of the composites relating to the Sioux Indians and the Sandwich Islanders.

It is proposed to perfect the process, and prepare composite photographs of the principal groups of crania in the Museum, and it is hoped that this method may be made use of in other collections, as affording a valuable means of comparison between the crania possessed by them and those in the Army Medical Museum—a means of comparison which no system of measurements can take the place of.

The crania exhibited are a few typical specimens selected from the collection of the Army Medical Museum. This collection is already a large one, containing over 2,100 crania—the greater part of North American Indians—but it is very important that it should be made more complete, as regards many races or tribes, it being desirable to have at least twenty-five perfect crania in each group, while fifty would not be too many.

The following table shows the number and character of the crania in the collection, and indicates those groups in which additions are especially desirable:

	Total.	Imperfect.
NORTH AMERICAN SKULLS.		
Esquimaux .....	89	6
Mound Builders from Dakota .....	24	8
"    "    Wisconsin .....	4	3
"    "    Iowa .....	6	5
"    "    Illinois .....	19	15
"    "    Indiana .....	6	1
"    "    Ohio .....	8	6
"    "    California .....	16	8
"    "    Utah .....	6	5
"    "    Missouri .....	2	2
"    "    Kentucky .....	30	15
"    "    Virginia .....	1	
"    "    Tennessee .....	42	38
"    "    Mississippi .....	50	32
"    "    Louisiana .....	8	6
"    "    Alabama .....	1	1
"    "    Florida .....	70	33
"    "    Arkansas .....	25	23
Indians from Alaska .....	55	12
"    "    Peel's River .....	2	
Newitsee Indians .....	5	
Chemakum .....	1	
Spokane .....	1	
Flathead .....	27	9
Clallam .....	2	1
Salish .....	2	
Chehalis .....	3	
Makah .....	4	
Nisqually .....	7	
Nez Percés .....	4	1
Wathala .....	2	
Chinook .....	23	1
Oregon .....	14	7
Modock .....	7	1
Shoshone .....	2	
Snake .....	6	1
Cascade .....	1	
Ukiah .....	4	1
Ooki Pah Ute .....	2	1
Pah Ute .....	23	6
Utah .....	3	1
California .....	459	192
Nevada .....	7	5
Aztec .....	10	5

	Total.	Imper- fect.
NORTH AMERICAN SKULLS—Continued.		
Wintoon Indians.	1	
Digger "	1	
Cow-cow "	5	
Navajo "	22	7
Apache "	38	8
Hare "	1	
Blackfeet "	6	5
Piegan "	14	1
Gros Ventre "	4	1
Mandan "	3	
Arickaree "	2	
Assiniboine "	5	1
Sioux "	36	6
Brule Sioux "	31	1
Ogallala "	15	
Yankton "	14	
Sissiton "	16	2
Santee "	1	
Teton "	1	
Wahpeton "	4	
Menominee "	1	1
Dakota "	15	
Ponka "	32	1
Crow "	2	
Caddo "	3	
Minnetaree "	25	10
Winnebago "	3	
Pawnee "	8	
Kickapoo "	2	
Arapahoe "	12	2
Cheyenne "	38	9
Kaw "	5	
Shawnee "	1	
Pottawatomic "	3	
Osage "	6	
Seneca "	1	
Wishita "	10	
Kiowa "	5	
Choctaw "	5	1
Chickasaw "	1	
Iowaulkeno "	1	
Keechi "	3	1
New Mexican "	7	
Comanche "	9	3
Lipan "	3	
Tonkaway "	6	
Texan "	4	2
Pueblo "	5	1
Mexican "	7	2
Cree "	1	

	Total.	Imper- fect.
NORTH AMERICAN SKULLS—Concluded.		
Chippewa Indians .....	20	4
Wisconsin ..	8	5
Sac ..	1	
Pequod ..	3	1
Miami ..	1	
Seminole ..	5	1
Connecticut (Tunxis) .....	1	
Bannock ..	1	
Cœur d'Alene ..	1	
Unknown ..	67	21
Negroes ..	47	3
Whites ..	128	29
CENTRAL AND SOUTH AMERICAN, INCLUDING YUCATAN.		
Yucatan Indians .....	8	1
Guatemala ..	2	1
U. S. of Columbia Indians .....	1	1
Peruvian ..	25	8
Matico ..	4	
Chilian ..	3	1
Patagonian ..	3	
From Chatham Island .....	3	1
EUROPEAN SKULLS.		
Austrians .....	15	3
Bavarians ..	9	
Danes ..	1	
English ..	1	
French ..	2	
Germans ..	4	2
Hungarians ..	2	
Romans—British ..	2	
Laplanders ..	3	
Russians ..	11	
Spaniards ..	1	
Romans ..	1	
ASIATIC SKULLS.		
Esquimaux Asiatics .....	10	4
Chuckchees ..	2	
Japanese ..	5	
Coreans ..	2	
Chinese ..	6	
Botan Tribe of Formosa .....	3	
Jews ..	1	
AFRICAN SKULLS.		
Egyptians ..	1	
Hottentots ..	1	

	Total.	Imper- fect.
CRANIA FROM OCEANICA.		
Sandwich Islanders .....	147	36
South Sea Islanders .....	8	
Philippine Islanders .....	5	4
New Zealanders .....	17	1
Fiji Islanders .....	5	
Mixed Races .....	12	3
Unknown Crania .....	52	20

JOHN S. BILLINGS,  
*Surgeon U. S. Army,*  
*Curator Army Medical Museum.*

## LIST OF COMPOSITE PHOTOGRAPHS OF CRANIA FROM ARMY MEDICAL MUSEUM.

Nos. 1, 2, 3, 4 and 5 were prepared by the ordinary wet process, with strong-working collodion, under an exposure of 70 seconds to each cranium.

Nos. 6 to 18, inclusive, were taken on Beebe's Gelatin Dry Plate. The exposure of each cranium in Nos. 6 to 13, and No. 16, was 3 seconds; in Nos. 14 and 15, only  $1\frac{1}{2}$  seconds; in Nos. 17 and 18, one second.

No.	SUBJECT.
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- |    |  |
|----|--|
| 1. | Composite photograph of seven adult male <i>Esquimaux</i> skulls, side view, Nos. 1189, 1190, 1187, 1206, 1182, 1191, 1195, Section IV, A. M. M. Wet process, exposure 70 seconds.     |
| 2. | Composite photograph of seven adult male <i>Esquimaux</i> skulls, front view, Nos. 1189, 1190, 1187, 1206, 1182, 1191, 1195, Section IV, A. M. M. Wet process, exposure 70 seconds.    |
| 3. | Composite photograph of seven adult male <i>Sandwich Islanders'</i> skulls, side view, Nos. 425, 444, 442, 445, 446, 438, 286, Section IV, A. M. M. Wet process, exposure 70 seconds.  |
| 4. | Composite photograph of seven adult male <i>Sandwich Islanders'</i> skulls, front view, Nos. 425, 444, 442, 445, 446, 438, 286, Section IV, A. M. M. Wet process, exposure 70 seconds. |
| 5. | Composite photograph of seven adult male <i>Sioux Indian</i> skulls, front view, Nos. 483, 793, 792, 1119, 665, 330, 816, Section IV, A. M. M. Wet process, exposure 70 seconds.       |

6. Composite photograph of seven adult male *Negro skulls*, side view, Nos. 980, 411, 955, 949, 953, 979, 954, Section IV, A. M. M. Dry process, exposure 3 seconds.
7. Composite photograph of seven adult male *Negro skulls*, front view, Nos. 980, 411, 955, 949, 953, 979, 954, Section IV, A. M. M. Dry process, exposure 3 seconds.
8. Composite photograph of seven adult male *Apache Indian skulls*, front view, Nos. 6578, Section I, 2108, 1709, 329, 209, 907, 1168, Section IV, A. M. M. Dry process, exposure 3 seconds.
9. Composite photograph of seven adult male *Apache Indian skulls*, side view, Nos. 6578, Section I, 2108, 1709, 329, 209, 907, 1168, Section IV, A. M. M. Dry process, exposure 3 seconds.
10. Composite photograph of eight adult male *Ponca Indian skulls*, side view, Nos. 836, 837, 835, 834, 831, 487, 486, 877, Section IV, A. M. M. Dry process, exposure 3 seconds.
11. Composite photograph of eight male adult *Ponca Indian skulls*, front view, Nos. 836, 837, 835, 834, 831, 487, 486, 877 Section IV, A. M. M. Dry process, exposure 3 seconds.
12. Composite photograph of seven adult male *White skulls*, Nos. 6306<sup>3</sup>, 7023, 6305, Section I, 63, 2118, 2119, 38, Section IV, A. M. M. Front view. Dry process, exposure 3 seconds.
13. Composite photograph of seven adult male *White skulls*, Nos. 6306<sup>3</sup>, 7023, 6305, Section I, 63, 2118, 2119, 38, Section IV, A. M. M. Side view. Dry process, exposure 3 seconds.
14. Composite photograph of eighteen adult male *Cheyenne Indian skulls*, Nos. 5560, 6525, Section I, 526, 2091,

528, 8, 715, 149, 146, 150, 1762, 9, 913, 464, 2121, 2090, 2035, 773, Section IV, A. M. M. Front view. Dry process, exposure  $1\frac{1}{2}$  seconds.

15. Composite photograph of eighteen adult male *Cheyenne Indian skulls*, Nos. 5560, 6525, Section I, 526, 2091, 528, 8, 715, 149, 146, 150, 1762, 9, 913, 464, 2121, 2090, 2035, 773, Section IV, A. M. M. Side view. Dry process, exposure  $1\frac{1}{2}$  seconds.
16. Composite photograph of seven adult male *Sandwich Islanders' skulls*, base view, Nos. 425, 442, 444, 445, 446, 438, 286, Section IV, A. M. M. Dry process, exposure 3 seconds.
17. Composite photograph of seven adult male *Sioux Indian skulls*, base view, Nos. 483, 793, 792, 1119, 665, 330, 816, Section IV, A. M. M. Dry process, exposure 1 second.
18. Composite photograph of seven adult male *Sioux Indian skulls*, side view, Nos. 483, 793, 792, 1119, 665, 330, 816, Section IV, A. M. M. Dry process, 1 second exposure.



# The World's Industrial and Cotton Centennial Exposition,

NEW ORLEANS, LA., 1884-'85.

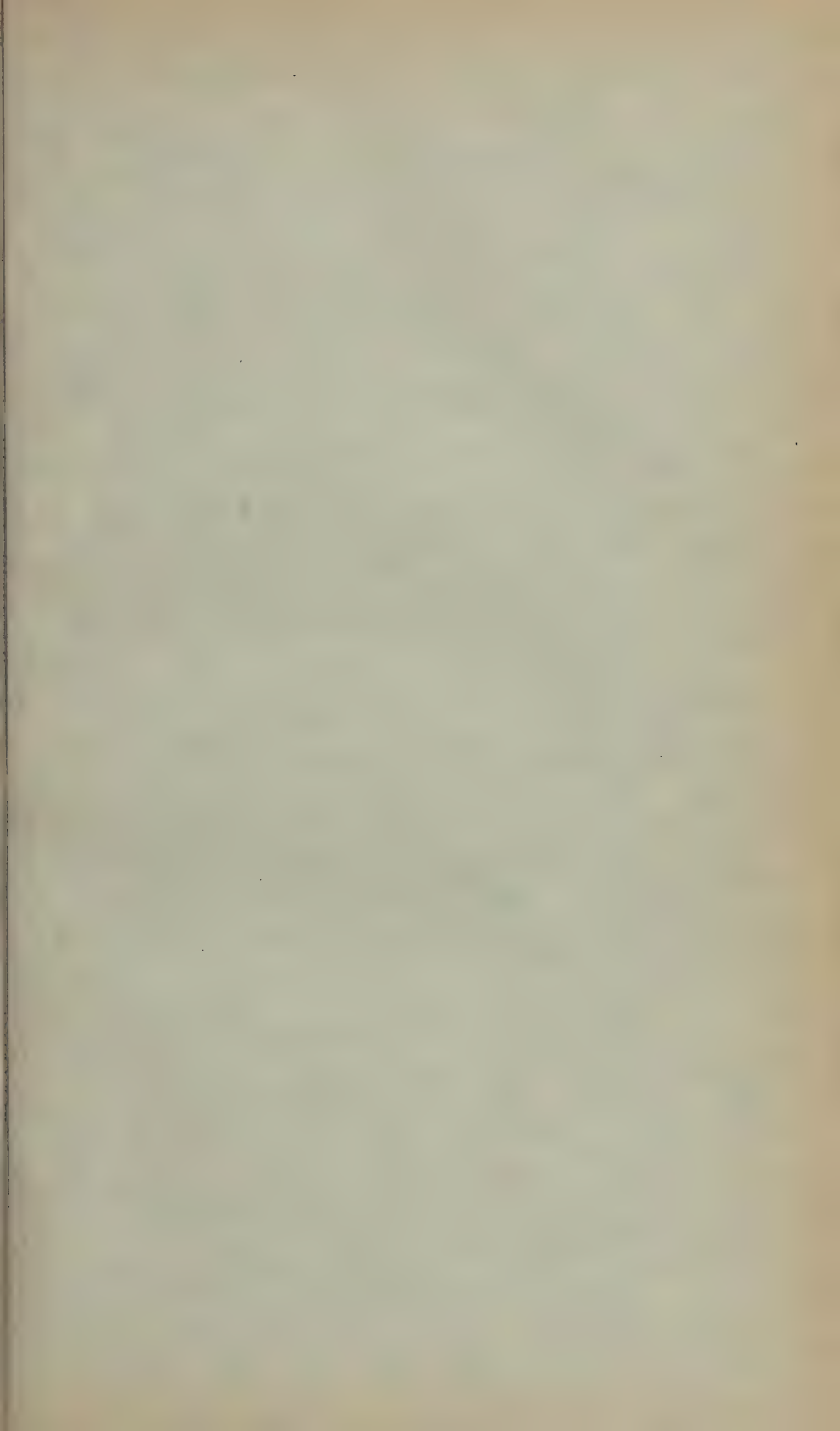
## LIST OF THE CRANIA FROM THE ARMY MEDICAL MUSEUM.

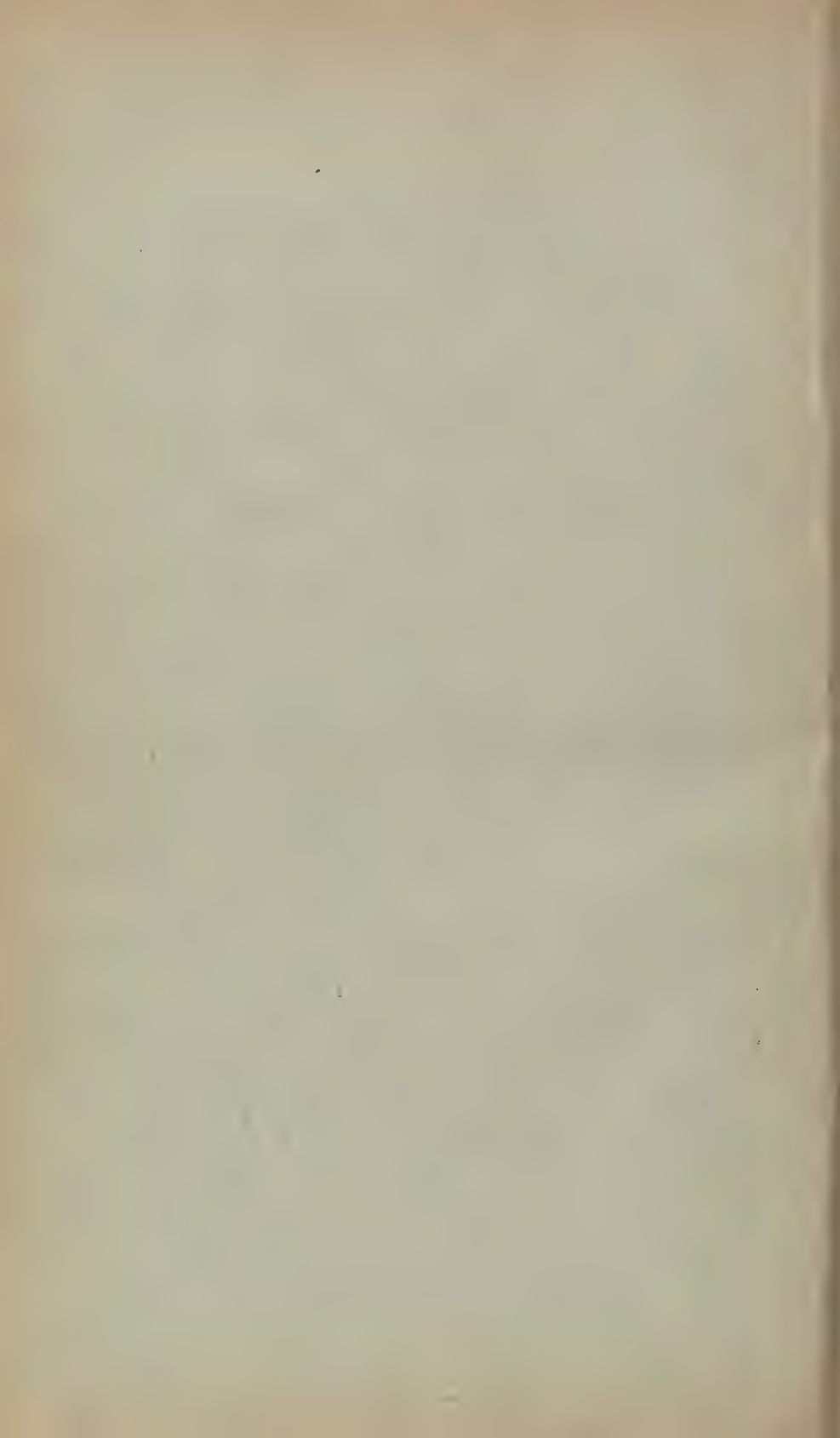
- Spec. 937. (Sect. IV.) Cranium of an Aleutian (prehistoric).  
from Ulakla Harbor, Amaknak Island, 1872,  
Collected by W. H. Dall. Received from the  
Smithsonian Institution.
- Spec. 688. (Sect. IV.) Cranium of a male Snake Indian, et.  
c. 50. From Fort Boise, Idaho, 1868. Donor:  
Surgeon C. Wagner, U. S. A.
- Spec. 691. (Sect. IV.) Cranium of a Chehalis Indian. From  
Gray's Harbor, Washington Territory, 1868. (?)  
Donor: Assistant Surgeon W. E. Whitehead,  
U. S. A.
- Spec. 246. (Sect. IV.) Cranium of a Makah Indian. From  
near Old Spanish Fort, Washington Territory,  
1864. Collected by J. G. Swan. Received  
from the Smithsonian Institution.
- Spec. 810. (Sect. IV.) Cranium of a male Ukie Indian.  
From Round Valley, California, 1870. Donor:  
Assistant Surgeon E. J. Marsh, U. S. A.
- Spec. 117. (Sect. IV.) Cranium of a Flathead Indian. From  
Chinook Burial Place, at mouth of Columbia  
River, 1868. Collected by Mr. Lloyd Brooke.  
Received from the museum of the National  
Medical College.
- Spec. 1158. (Sect. IV.) Cranium of a female Flathead Indian,

- æ. c. 55. From Fort Cape Disappointment, Washington Territory, 1874. Donor: Assistant Surgeon John Brooke, U. S. A.
- Spec. 1117. (Sect. IV.) Cranium of a male Chippewa Indian, æ. c. 35. From St. Joseph, 30 miles west of Pembina, Dakota, 1874. Donor: Assistant Surgeon Ezra Woodruff, U. S. A.
- Spec. 881. (Sect. IV.) Cranium of a female Ponca Indian, æ. c. 30. From Old Ponca Agency, Niobrara River, Dakota, 1871. Donor: Acting Assistant Surgeon G. N. Hopkins, U. S. A.
- Spec. 683. (Sect. IV.) Cranium of a Comanche Indian. From Fort Concho, Texas, 1869. Donor: Surgeon Wm. M. Notson, U. S. A.
- Spec. 523. (Sect. IV.) Cranium of a male Keechie Indian, æ. c. 40. From bank of Arkansas River, 1869. Donors: Surgeon B. E. Fryer, U. S. A., and Acting Assistant Surgeon E. S. Umbstaetter, U. S. A.
- Spec. 2047. (Sect. IV.) Cranium of a female Sioux, æ. c. 55. From Fort Robinson, Nebraska, 1880. Donor: Assistant Surgeon W. B. Brewster, U. S. A.
- Spec. 2073. (Sect. IV.) Cranium of an adolescent male Sioux. From Fort Robinson, Nebraska, 1880. Donor: Assistant Surgeon W. B. Brewster, U. S. A.
- Spec. 176. (Sect. IV.) Cranium of a male Navajo Indian, æ. c. 50. From Fort Sumner, New Mexico, 1868. Donor: Assistant Surgeon J. F. Weeds. U. S. A.
- Spec. 1560. (Sect. IV.) Calvarium of an unknown male Indian, æ. c. 60. From Winooski River, Vermont. Collected by Dr. E. M. Kent. Received from the Smithsonian Institution. Internal capacity, measured with No. 8 shot, 1920 c. c.

- Spec. 1236. (Sect. IV.) Cranium of a male Esquimaux, æt. c. 55. Collected in 1860-61 by Dr. I. I. Hayes.
- Spec. 259. (Sect. IV.) Calvarium of a male Kaiyuh Khotana, æt. c. 35. From Nulato, Yukon River, Alaska, 1867. Collector: W. H. Dall. Received from the Smithsonian Institution.
- Spec. 940. (Sect. IV.) Cranium of a male Moundbuilder, æt. c. 60. From near Fort Totten, Dakota, 1871. Donor: Acting Assistant Surgeon J. B. Ferguson, U. S. A.
- Spec. 168. (Sect. IV.) Cranium of a male Moundbuilder, æt. c. 50. From near Fort Wadsworth, Dakota, 1868. Donor: Acting Assistant Surgeon A. I. Comfort, U. S. A.







The World's Industrial and Cotton Centennial Exposition,  
NEW ORLEANS, LA., 1884-85.

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No. 8.

LIST OF CRANIA AND SKELETONS

IN THE

SECTION OF COMPARATIVE ANATOMY

OF THE

UNITED STATES ARMY MEDICAL MUSEUM,

WASHINGTON, D. C.

REVISED AT THE MUSEUM FOR USE DURING THE EXPOSITION.

---

SURGEON JOHN S. BILLINGS, U. S. A.,

*Curator of Army Medical Museum.*

---

HENRY McELDERRY,

*Assistant Surgeon, U. S. A.,*

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT, U. S. A.

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New Orleans, La., 1884-'85.



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New Orleans. La. 1884-85.



THE WORLD'S  
INDUSTRIAL AND COTTON CENTENNIAL EXPOSITION,  
NEW ORLEANS, LA., 1884-'85.

---

LIST OF CRANIA AND SKELETONS

IN THE

SECTION OF COMPARATIVE ANATOMY.

IN THE

Army Medical Museum, at Washington, D. C.

---

This list of the skeletons and crania, contained in the Section of Comparative Anatomy of the United States Army Medical Museum, is printed for the purpose of indicating the deficiencies of the collection and the contributions to it which would be most desirable. It is proposed to enlarge this section of the collection in such a way as to make it most useful for illustrating human anatomy, both pathological and physiological; and to this end it is proposed to form, in addition to complete skeletons, sets or series of the different bones and organs, to illustrate the development and peculiarities of similar bones and organs in man. For this purpose it is desired to obtain specimens of pelvis; of the upper extremity, including the bones of the shoulder girdle; of the lower extremity; of the carpus and tarsus, etc., to illustrate the principal types of these bones in the vertebrata.

The appropriations for the support of the Museum are too limited to permit of the expenditure of any considerable sums on the collection of comparative anatomy. The specimens enumerated in the following list were, for the most part, collected by medical and other officers of the army on

duty at frontier posts. For the present, substantial increase of the collections can only be expected from donations, which will be thankfully received from any quarter.

Skeletons of the following North American animals are much desired for this section of the Museum: Wild Cat (*Lynx rufus*); Canada Lynx (*Lynx canadensis*); Eyra, (*Felis eyra*), Texas; Yaguarundi, (*Felis yaguarundi*), Texas; Panther (*Felis concolor*); Jaguar, (*Felis onca*), Texas; Ocelot (*Felis pardalis*); Fisher (*Mustela pennanti*); Wolverine (*Gulo luscus*); Badger (*Taxidea americana*); White-backed Skunk, (*Conepatus mapurito*), Texas; Little striped Skunk, (*Spilogale zorilla*), Pacific slope; Otter (*Lutra canadensis*); Sea Otter (*Enhydra marina*); Grizzly Bear (*Ursus arctos*); Black Bear (*Ursus americanus*); Peccary (*Dicotyles torquatus*); Mountain Goat (*Mazama montana*); Antelope (*Antilocapra americana*); Armadillo, (*Tatusia peba*), Texas, especially foetuses; Snowy Owl (*Nyctea nivea*); Hawk Owl (*Surnia ulula*); Burrowing Owl (*Spheotyto cunicularia*); Marsh Harrier (*Circus cyaneus*); Mississippi Kite (*Ictinia mississippiensis*); Swallow-tailed Kite (*Nauclerus furcatus*); Duck Hawk (*Falco peregrinus*); Fish Hawk (*Pandion haliaetus*); Wood Ibis (*Tantalus loculator*); Cormorant (*Graculus carbo*); Courlan (*Aramanus scolopaceus*); White Pelican (*Pelicanus trachyrhynchus*); Gannet (*Sula bassana*), and others.

In skeletons intended for the Museum no attempt should be made at cleaning; and especially they should not be boiled. If the animal is obtained in a fresh state, the flesh should be roughly cut off and the skeleton hung up in the shade to dry. Care should be taken that none of the small bones are lost, especially the hyoid bones. In taking out the viscera the costal cartilages should be left attached to ribs and sternum; but if it is found necessary in the case of large animals to disarticulate the ribs, the costal cartilages should always be left attached to the sternum. In animals as large or larger than the Prairie Wolf the skull and limbs may be

severed from the body, and the vertebral column divided in the lumbar region, for convenience in packing. In animals smaller than this the limbs, skull, etc., should be left attached. The limbs and tail can be neatly folded while the ligaments are soft and flexible. In the case of animals that have died and decomposed upon the plain, care should be exercised in getting all the bones. Skeletons should be packed in a tight box, with plenty of hay or straw to prevent breakage of the delicate processes. Small animals are best preserved in alcohol, in which case an incision should be made along the middle line of the abdomen to give the alcohol access to the viscera.

JOHN S. BILLINGS,  
*Surgeon U. S. Army,*  
*Curator Army Medical Museum.*



# LIST OF CRANIA AND SKELETONS OF MAMMALS.

*Note.*—In the preparation of this list the classification adopted is nearly the same as that of Dr. Theo. Gill in his paper entitled “*Arrangement of the Families of Mammals*,” Smithsonian Miscellaneous Collections, No. 230, 1872, and the nomenclature of the species is in accordance, for the most part, with the more recent views of prominent Mammalogists.

## CLASS **MAMMALIA.**

### SUB-CLASS **Eutheria.**

#### SECTION **MONODELPHIA.**

#### ORDER **Primates.**

#### SUB-ORDER **ANTHROPOIDEA.**

#### Family **SIMIIDÆ.**

Cran.	Skel.	
2507		<i>Troglodytes savagii</i> , Gray (Cast). ♂ <i>Gorilla</i> .
2508		<i>Troglodytes savagii</i> , Gray (Cast). ♀ <i>Gorilla</i> .
1407		<i>Simia satyrus</i> , Linn. <i>Orang Outang</i> .
2526		<i>Hylobates lar</i> , Linn. <i>Common Gibbon</i> .
Family <b>CYNOPITHECIDÆ.</b>		
Sub-Family <i>Colobinæ</i> .		
2482	2481	<i>Semnopithecus cuculatus</i> . <i>Langur</i> .
	1066	<i>Cercopithecus fuliginosus</i> , Cuvier. <i>Moor Ape Monkey</i> .
	1299	<i>Cercopithecus pygerythus</i> , Cuvier. <i>Vervet</i> .
	1300	<i>Macacus senicus</i> (Desm.); Gray. <i>Capped Macaque</i> .
1382		<i>Macacus cynomolgus</i> , Desm. <i>The Kra</i> .
	2483	<i>Cynopithecus niger</i> . <i>Black Macaque</i> .
	1297	<i>Cynocephalus procarius</i> , Desm. <i>Charma</i> .
Family <b>CEBIDÆ.</b>		
	1298	<i>Mycetes seniculus</i> , Kuhl. <i>Golden Howler</i> .
	1296 2203	<i>Ateles paniscus</i> , Geoff. <i>Spider Monkey</i> .
	2418	<i>Lagothrix humboldtii</i> , Geoff St. Hilaire. <i>Humboldt's Monkey</i> .

Cran.	Skel.	
		Family <b>MIDIDÆ</b> .
	1302	( <i>Edipus titi</i> , Lesson. <i>Pinche</i> .
	2527	<i>Midas rosalia</i> .
845		<i>Hapale jacchus</i> . <i>Marmoset</i> .
		SUB-ORDER <b>PROSIMIÆ</b> .
		Family <b>LEMURIDÆ</b> .
		Sub-Family <i>Lemurinae</i> .
	2485	<i>Vareca varia</i> . <i>Ruffed Lemur</i> .
	2525	<i>Nycticebus tardigradus</i> . <i>Slow Lemur</i> .
		Sub-Family <i>Lorinae</i> .
	2484	<i>Loris gracilis</i> . <i>Slender Loris</i> .
		Sub-Family <i>Galaginae</i> .
	2524	<i>Galago otolincus</i> .
		Family <b>TARSIIDÆ</b> .
	1301	<i>Tarsius spectrum</i> , Geoff. <i>Tarsius</i> .
		ORDER <b>Carnivora</b> .
		SUB-ORDER <b>FISSIPEDIA</b> .
		Family <b>FELIDÆ</b> : <i>Cats, etc.</i>
952		<i>Lynx rufus</i> (Guldenstädt), Raf. <i>Wild Cat</i> .
1059		
1160		
1080		<i>Lynx rufus maculatus</i> , Cs. and Yar. <i>Texas Wild Cat</i> .
1383	793	<i>Lynx rufus fasciatus</i> , Cs. and Yar. <i>Red Cat</i> .
1396		
180		<i>Lynx canadensis</i> (Geoff and Desm.), Raf. <i>Canada Lynx</i> .
178	631	<i>Felis concolor</i> , Linn. <i>Panther</i> ; <i>Painter</i> ; <i>Puma</i> ; <i>Cougar</i> ;
179		<i>American or California Lion</i> .
828		
954		
1412		<i>Felis onça</i> , Linn. <i>Jaguar</i> ; <i>Mexican Tiger</i> .
95	20	<i>Felis domesticus</i> , Linn. <i>Common Cat</i> .
181		
182		
183		
	1307	<i>Felis tigris</i> , Cuv. <i>Bengal Tiger</i> .

Cran.	Skel.	
		Family VIVERRIDÆ.
	2487	<i>Herpestes mangusta. Mongoose.</i>
	2529	<i>Gennetta vulgaris. Civet.</i>
		Family CANIDÆ: <i>Dogs, etc.</i>
184	712	<i>Canis lupus occidentalis, Cs. and Yar. American Wolf;</i>
185		<i>Timber or Buffalo Wolf; Lobo of the Mexicans.</i>
713		
714		
1235		
1417		
1418		
186	907	<i>Canis latrans, Say. Coyote; Prairie Wolf.</i>
710	1084	
711		
715		
1323		
1324		
29	76	<i>Canis familiaris, Linn. Common Dog.</i>
35		
187		
188		
739		
189	99	<i>Vulpes vulgaris pennsylvanicus, Cs. Red Fox.</i>
190		
191		
192		
1161	1196	<i>Vulpes macrourus, Baird. Prairie Fox.</i>
953	1314	<i>Vulpes velox, Aud. and Bach. Kit Fox; Swift Fox.</i>
1546	1571	<i>Urocyon littoralis (Baird), Gill. Island Fox.</i>
193	2523	<i>Urocyon cinereo-argentatus (Schreber), Cs. Gray Fox.</i>
194		
195		
196		
		Family MUSTELIDÆ: <i>Martins, Weasels, etc.</i>
		Sub-Family <i>Mustelinæ</i> ; Typical Weasels.
723		<i>Mustela martes, Brisson. Forest Mink.</i>
198		<i>Mustela pennanti, Erxl. Fisher; Black Cat.</i>
197		<i>Mustela americana, Turton. Pine Martin; American Sable.</i>
957		
2088	852	<i>Putorius longicauda, Rich. Long-tailed Ermine.</i>
	1424	

Cran.	Skel.	
1058	722 1075	<i>Putorius erminea</i> (Linn.), Cuv. <i>White Weasel; Ermine.</i>
724		<i>Putorius foetidus</i> , Linn. <i>European Iltis.</i>
720		<i>Putorius vulgaris</i> Briss. <i>Field Weasel.</i>
732		<i>Putorius erminea</i> Linn. <i>Great Weasel.</i>
199 595 1315 1316		<i>Putorius vison</i> , Rich. <i>Brown Mink.</i>
200		<i>Gulo luscus</i> , Sabine. <i>Wolverine.</i>
Sub-Family <i>Melinae</i> : Badgers.		
203 612 834 950 1236 1244 1419	795	<i>Taxidea americana</i> (Bodd), Baird. <i>Missouri Badger.</i>
736		<i>Meles taxus</i> , Schreber. <i>European Badger.</i>
825 202 704 956 1193 2084	161 2185	<i>Mephitis mephitis</i> (Shaw), Baird. <i>American Skunk.</i>
Sub-Family <i>Lutrinae</i> : Otters.		
740		<i>Lutra vulgaris</i> Linn. <i>European Otter.</i>
201 951		<i>Lutra canadensis</i> (Turton), Cuv. <i>American Otter.</i>
Family <i>URSIDÆ</i> : Bears.		
205 672 1006 1043 2240	1042	<i>Ursus arctos horribilis</i> (Ord.), Cs. and Yar. <i>Grizzly Bear.</i>
	2488	<i>Ursus arctos.</i> <i>European Brown Bear.</i>
206 207 208 209 210 1380 1381	1200 1210 1243 2463	<i>Ursus americanus</i> , Pallus. <i>Black Bear.</i>

Cran.	Skel.	
211		<i>Ursus maritimus</i> (Linn.). <i>White or Polar Bear.</i>
		Family PROCYONIDÆ: <i>Raccoons, etc.</i>
204	134	<i>Procyon lotor</i> (Linn.), Starr. <i>Common Raccoon.</i>
613	2078	
1060		
2077		
		SUB-ORDER PINNIPEDIA.
		Family OTARIIDÆ: <i>Eared Seals.</i>
	1057	<i>Callirhinus ursinus</i> (Schreber), Gray. <i>Fur Seal.</i>
1048		<i>Eumetopias stelleri</i> (Fischer), Gray. <i>Sea Lion.</i>
261		<i>Zalophus gilliespii</i> (MacBain), Gill. <i>Sea Dog.</i>
		Family PHOCIDÆ: <i>Hair Seals.</i>
		Sub-Family Phocinæ.
259		<i>Phoca vitulina</i> Linn. <i>Common Seal; Harbor Seal.</i>
2192		
258		<i>Erignathus barbatus</i> (O. Fabr.), Gill. <i>Square-Flipper Seal.</i>
		Sub-Family Cystophorinæ: <i>Crested Seals.</i>
260		<i>Cystophora cristata</i> (Erxl.), Nilsson. <i>Hooded Seal.</i>
		Family ROSMARIDÆ: <i>Walruses.</i>
888	1053	<i>Rosmarus obesus</i> (Illiger), Gill. <i>Atlantic Walrus.</i>
		ORDER Diplarthra.
		SUB-ORDER ARTIODACTYLI.
		Family BOVIDÆ: <i>Bovines.</i>
		Sub-Family Bovinæ: <i>Typical Bovines.</i>
832	686	<i>Bison americanus</i> (Gmelin), Gray. <i>American Buffalo.</i>
959		
50	802	<i>Bos taurus</i> (Linn.), Cuvier. <i>Cow.</i>
2221		
		Sub-Family Ovinæ: <i>Sheep.</i>
671	1061	<i>Ovis montana</i> , Cuvier. <i>Rocky Mountain Sheep; Bighorn.</i>
1049		
1422		
2259		
257		<i>Ovis aries</i> , Linn. <i>Common Sheep.</i>
619		
620		
		Sub-Family Caprinæ: <i>Goats, etc.</i>
254	106	<i>Capra hircus</i> . <i>Common Goat.</i>
255		
256		

Cran.	Skel.	
738		<i>Rupicapra tragus</i> , Linn. <i>Chamois</i> .
		Family ANTILOCAPRIDÆ: <i>American Antelopes</i> .
252		<i>Antilocapra americana</i> (Ord.). <i>Antelope</i> ; <i>Prong-horn Antelope</i> ; <i>Cabree</i> .
253		
632		
633		
1050		
		Family CAMELIDÆ.
	2491	<i>Llama pacos</i> . <i>Alpaca</i> .
		Family CERVIDÆ: <i>Deer</i> .
		Sub-Family Cervinæ: <i>Typical Deer</i> .
247	1069	<i>Cervus canadensis</i> , Erxl. <i>American Elk</i> ; <i>Wapiti</i> .
1022		
1077		
1525		
1537		
248	1545	<i>Cariacus macrotis</i> (Say), Gray. <i>Mule, or Black tailed Deer</i> .
1394	1589	
2241		<i>Cariacus macrotis</i> var. <i>columbianus</i> (Rich.), <i>Columbia Black-tailed Deer</i> .
249	634	<i>Cariacus virginianus</i> (Bodd), Gray. <i>Virginia Deer</i> ; <i>Red Deer</i> .
250		
251		
622		
635		
833	1544	<i>Cariacus virginianus macrourus</i> (Raf.), Cs. <i>White-tailed Deer</i> .
1395		
		Family TRAGULIDÆ.
	2492	<i>Tragulus javanicus</i> . <i>Java Musk Deer, or Chevrotian</i> .
		Family PHACOCERIDÆ.
1309		<i>Phacochoerus æliani</i> , Gretz. <i>Wart Hog</i> .
		Family DYCOTYLIDÆ: <i>Peccaries</i> .
244	829	<i>Dicotyles torquatus</i> , Cuvier. <i>Peccary</i> .
		Family SUIDÆ: <i>Swine</i> .
47	123	<i>Sus scrofa</i> , Linn. <i>Common Hog</i> .
52		
245		
246		
		SUB-ORDER PERISSODACTYLI.
		Family EQUIDÆ: <i>Horses, etc</i> .
34	801	<i>Equus caballus</i> , Linn. <i>Horse</i> .

Cran.	Skel.	
1408		<i>Equus asinus caballus</i> , Linn. <i>Mule</i> .
ORDER <b>Sirenia</b> .		
Family HALICORIDÆ.		
2490		<i>Halicore australis</i> . <i>Dugong</i> .
ORDER <b>Cetacea</b> .		
SUB-ORDER <b>DENTICETE</b> .		
Family DELPHINIDÆ: <i>Dolphins, etc.</i>		
Sub-Family <i>Delphininæ</i> : Typical Dolphin.		
262	1308	<i>Delphinus delphis</i> , Linn.
1148 1266 1267		<i>Delphinus chymene</i> , Gray. <i>Porpoise</i> .
	2489	<i>Delphinus tursio</i> .
1554		<i>Phocæna americana</i> , Agassiz. <i>Snuffler or Puffing Pig</i> .
SUPER-ORDER <b>INEDUCABILIA</b> .		
ORDER <b>Chiroptera</b> .		
SUB-ORDER <b>ANIMALIVORA</b> .		
Family NOCTILIONIDÆ: <i>Free-tailed Bats</i> .		
2381	601	<i>Nyctinomus nasutus</i> (Spix.), Tomes. <i>Snouty Bat</i>
Family VESPERTILIONIDÆ: <i>Ordinary Bats</i> .		
986		<i>Corynorhinus macrotis</i> (Le Conte), Allen. <i>Big-eared Bat</i> .
981 2224 2231 2232		<i>Antrozous pallidus</i> (Le Conte), Allen. <i>Pale Bat</i> .
	848	
1192	1009	<i>Atalapha (Nycticejus) crepuscularis</i> (Le Conte), Cs. <i>Twilight Bat</i> .
731		<i>Vesperugo noctula</i> , Blas. <i>Shining Bat</i> .
728		<i>Vesperugo pipistrellus</i> , Blas. <i>Common European Bat</i> .
729		<i>Vesperugo discolor</i> , Blas. <i>Parti-colored Bat</i> .
727		<i>Plecotus auritus</i> (Linn.), Geoff. <i>Long-eared Bat</i> .
1353	1198	<i>Atalapha (Lasiurus) noveboracensis</i> (Exrl.), Cs. <i>Red Bat</i> ; <i>New York Bat</i> .

Cran.	Skel.	
992	113	<i>Vespertilio subulatus</i> , Say. <i>Little Brown Bat</i> .
996	600	
997		
1208		
1008	174	<i>Vespertilio (Vesperus) fuscus</i> , Beauv. <i>Carolina Brown Bat</i> .
	845	
1134	849	<i>Vespertilio (Vesperugo) georgianus</i> , F. Cuv. <i>Georgia Bat</i> .
ORDER <b>Insectivora</b> .		
Family <b>CENTETIDÆ</b> .		
	2486	<i>Centetes caudatus</i> . <i>Tenrec</i> .
Family <b>TALPIDÆ</b> : <i>Moles</i> .		
Sub-Family <i>Talpinæ</i> : <i>Typical Moles</i> .		
734		<i>Talpa europæa</i> , Linn. <i>Black Mole</i> .
735		
	112	<i>Scalops aquaticus</i> (Linn.), Cuvier. <i>Common Mole</i> .
2155		<i>Scalops argentatus</i> , Aud. <i>Silvery Mole</i> .
	1106	<i>Condylura cristata</i> (Linn.), Illiger. <i>Star-nosed Mole</i> .
Family <b>TAUPAIADÆ</b> .		
	2521	<i>Taupaia minor</i> . <i>Squirrel Shrew</i> .
Family <b>SORICIDÆ</b> : <i>Shrews</i> .		
232		<i>Sorex personatus</i> , Geoff. <i>Masked Shrew</i> .
2166		<i>Sorex cooperi</i> , Bach. <i>Cooper's Shrew</i> .
2167		
2168		
2169		
2182		<i>Sorex pachyurus</i> , Baird. <i>Thick-tailed Shrew</i> .
2183		
2142	2141	<i>Blarina brevicauda</i> , Gray. <i>Short-tailed Shrew</i> .
2143		
Family <b>ERINACEIDÆ</b> : <i>Hedgehogs</i> .		
725		<i>Erinaceus europæus</i> , Linn. <i>Hedgehog</i> .
ORDER <b>Rodentia</b> .		
SUB-ORDER <b>MYOMORPHA</b> .		
Family <b>ZAPODIDÆ</b> : <i>Jumping Mice</i> .		
1326	2113	<i>Zapus hudsonius</i> (Zimm.), Cs. <i>Jumping Mouse</i> .
1707		
2136		
2137		

Cran.	Skel.	
Family MURIDÆ: Mice.		
Sub-Family Murinæ: Typical Mice.		
130 222 223 552	19	<i>Mus decumanus</i> , Pallas. <i>Common Rat.</i>
984 985		<i>Mus tectorum</i> , Savi. <i>White-bellied Rat.</i>
225 226 227	69 1191	<i>Mus musculus</i> , Linn. <i>Common House Mouse.</i>
224 983 2154 2157	2156	<i>Neotoma floridana</i> (Say), Ord. <i>Wood Rat.</i>
2111 967 968 969 970	1356	<i>Neotoma cinerea</i> (Ord.), Baird. <i>Rocky Mountain Rat.</i> <i>Sigmodon hispidus</i> (Say), Ord. <i>Cotton Rat.</i>
597 1328 1573 1708	1406	<i>Hesperomys</i> ( <i>Vesperimus</i> ) <i>leucopus</i> (Raf.). <i>White-footed Mouse.</i>
2138	2080 2135	<i>Hesperomys</i> ( <i>Onychomys</i> ) <i>leucogaster</i> (Mar.), Coues. <i>Missouri Mole Mouse.</i>
1574	2068 2069 2070 2071 2072 2073	<i>Ochetodon longicauda</i> (Baird), Cs. <i>Long-tailed Mouse.</i>
Sub-Family Arvicolinæ: Field Mice.		
608 1040 1404 1710 2086	1709 2087	<i>Arvicola</i> ( <i>Myonomes</i> ) <i>riparius</i> , Ord. <i>Field Mouse.</i>
726		<i>Arvicola amphibius</i> , Linn. <i>Water Rat.</i>
2223		<i>Arvicola</i> ( <i>Myonomes</i> ) <i>townsendi</i> , Bach. <i>Townsend's Meadow Mouse.</i>
2133 2134 2151 2152	2150	<i>Arvicola</i> ( <i>Podomys</i> ) <i>austerus</i> , Lee. <i>Prairie Meadow Mouse.</i>

Cran.	Skel.	
22	2066	<i>Fiber zibethicus</i> (Linn.), Cuvier. <i>Musk Rat</i> .
229		
230		
1194		
1317		
1421		
		Family SACCOMYIDÆ: <i>Pouched Mice</i> .
		Sub-Family <i>Dipodomys</i> .
	681	<i>Dipodomys phillipsi</i> (Woodh.), Cs. <i>Kangaroo Rat</i> .
	1137	
	1569	
99C		<i>Cricetodipus flavus</i> , Baird. <i>Western Mouse</i> .
1705		<i>Perognathus hispidus</i> , Baird.
1706		
		Family GEOMYIDÆ: <i>Gophers</i> .
719	1703	<i>Geomys bursarius</i> , Shaw. <i>Pouched Gopher</i> .
827	1895	
1237	2062	
2064	2063	
2065		
	1310	<i>Thomomys talpoides</i> (Rich.), Baird. <i>Fort Union Gopher</i> .
	1704	
1001	1572	<i>Thomomys talpoides umbrinus</i> (Rich.), Cs. <i>Black-faced Gopher</i> .
1002		
1551		
2474		
		SUB-ORDER SCIUROMORPHA.
		Family CASTORIDÆ: <i>Beavers</i> .
220	1081	<i>Castor canadensis</i> , Kuhl. <i>American Beaver</i> .
221	1082	
794	1901	
822		
		Family SCIURIDÆ: <i>Squirrels, etc.</i>
		Sub-Family <i>Sciurinae</i> : Typical Squirrels.
975	1357	<i>Sciurus aberti</i> , Woodh. <i>Tuft-eared Squirrel</i> .
216	1355	<i>Sciurus hudsonius</i> , Pallas. <i>Red Squirrel</i> .
	2059	
	2278	<i>Sciurus hudsonius</i> var. <i>fremonti</i> (Pallas), Allen. <i>Fremont's Squirrel</i> .
1550		<i>Sciurus hudsonius</i> var. <i>douglassi</i> (Bach.), Allen. <i>Oregon Red Squirrel</i> .
214		<i>Sciurus cinereus</i> , Linn. <i>Fox or Cat Squirrel of Middle States</i> .
215		

Cran-     Skel.

623		<i>Sciurus niger</i> var. <i>cinereus</i> (Linn.), Allen. <i>Southern Fox Squirrel.</i>
624		
	2208	<i>Sciurus niger</i> var. <i>ludovicianus</i> (Cret), Allen. <i>Western Fox Squirrel.</i>
	10	<i>Sciurus carolinensis</i> , Gmelin. <i>Gray Squirrel.</i>
	175	<i>Sciuropterus volucella</i> var. <i>volucella</i> (Desm.), Allen. <i>Flying Squirrel.</i>
896		<i>Sciuropterus volucella</i> var. <i>hudsonius</i> (Bach.), Allen. <i>Oregon Flying Squirrel.</i>
596	561	<i>Tamias striatus</i> (Linn.). <i>Chipmunk.</i>
2139	2061	
1361	1362	<i>Tamias quadrivittatus</i> (Say), Rich. <i>Four-striped Squirrel.</i>
1667		
1687		
2234		<i>Tamias harrisi</i> (Aud. and Bach.), Allen. <i>Harris' Chipmunk.</i>
1549	1363	<i>Tamias lateralis</i> (Say), Allen. <i>Rocky Mountain Chipmunk.</i>
974		<i>Spermophilus grammurus</i> (Say), Bach. <i>Line-tail Squirrel.</i>
1398		
1312	1311	<i>Spermophilus tridecem-lineatus</i> (Mitch.), Aud. and Bach.
1313	2060	<i>Striped Prairie Squirrel.</i>
1686		
1433		<i>Spermophilus richardsoni</i> (Sabine), Bd. <i>Richardson's Gopher.</i>
2126		<i>Spermophilus richardsoni</i> var. <i>townsendi</i> (Sab.), Allen. <i>Townsend's Spermophile.</i>
2145	2146	<i>Spermophilus franklini</i> (Sab.), Lesson. <i>Franklin's Spermophile; Gray-headed Spermophile.</i>
2147		
2138		
2149		
2160	2159	<i>Spermophilus mexicanus</i> (Licht), Wagner. <i>Mexican Spermophile.</i>
2161		
2162		
2163		
1548	1570	<i>Spermophilus beecheyi</i> (Rich.), Allen. <i>California Ground Squirrel.</i>
1547		
217	905	<i>Cynomys ludovicianus</i> (Ord.), Bd. <i>Prairie Dog.</i>
218	1409	
835	1410	
903		
904		
2158	1352	<i>Cynomys columbianus</i> (Ord.), Allen. <i>Short-tailed Prairie Dog.</i>

Cran.      Skel.

Sub-Family *Arctomyinae*: Woodchucks.

- |      |      |   |
|------|------|---|
| 219  | 1205 | <i>Arctomys monax</i> , Linn. <i>Woodchuck</i> .                            |
| 2056 |      |   |
| 1358 |      | <i>Arctomys flaviventer</i> , Aud. and Bach. <i>Yellow-bellied Marmot</i> . |

SUB-ORDER **HYSTRICOMORPHA**.

Family **HYSTRICIDÆ**: *Porcupines*.

- |      |      |  |
|------|------|--|
| 978  |      | <i>Erethizon dorsatus</i> , Cuvier. <i>Porcupine</i> .                 |
| 231  | 2320 | <i>Erethizon epixanthus</i> , Brandt. <i>Yellow-haired Porcupine</i> . |
| 1680 |      |  |

Family **CAVIIDÆ**: *Cavies, etc.*

- |     |      |   |
|-----|------|---|
| 869 | 1918 | <i>Cavia cabaya</i> , Linn. <i>Guinea Pig</i> . |
| 870 |      |   |
| 908 |      |   |
| 909 |      |   |

SUB-ORDER **LAGOMORPHA**.

Family **LEPORIDÆ**: *Hares*.

- |      |      |  |
|------|------|--|
| 239  |      | <i>Lepus americanus</i> , Erxl. <i>Great Northern Hare</i> .         |
| 237  | 1756 | <i>Lepus callotis</i> , Wagler. <i>Jackass Rabbit</i> .              |
| 797  | 1896 |  |
| 1238 |      |  |
| 1360 |      |  |
| 1405 |      |  |
| 2390 |      | <i>Lepus campestris</i> , Bach. <i>Northern Prairie Hare</i> .       |
| 240  | 164  | <i>Lepus sylvaticus</i> , Bach. <i>Eastern Gray Rabbit</i> .         |
| 241  |      |  |
| 242  |      |  |
| 243  |      |  |
| 2235 |      | <i>Lepus sylvaticus</i> aud. (Baird), Allen. <i>Audabon Rabbit</i> . |
| 972  |      | <i>Lepus sylvaticus nuttali</i> (Bach.), Allen. <i>Sage Rabbit</i> . |
| 987  |      |  |
| 988  |      |  |
| 989  |      |  |
| 1239 |      |  |
| 1240 |      |  |
| 1384 |      |  |
| 1669 |      |  |
| 1670 |      |  |
| 2094 |      | <i>Lepus trowbridgii</i> , Baird. <i>Trowbridge's Hare</i> .         |
| 238  |      | <i>Lepus palustris</i> , Bach. <i>Marsh Rabbit</i> .                 |
|      |      |  |
|      |      | Family <b>LEPORIDÆ</b> : <i>Rabbits, Hares, etc.</i>                 |
| 737  |      | <i>Lepus timidus</i> , Linn. <i>European Hare</i> .                  |

Cran.	Skel.	
234 235 237 1023	48	<i>Lepus cuniculus</i> , Linn. <i>English Rabbit</i> .
	818	<i>Lepus madagascarensis</i> , Linn. <i>Lop-eared Rabbit</i> .
ORDER <b>Bruta</b> .		
SUB-ORDER <b>TARDIGRADA</b> .		
Family BRADYPODIDÆ.		
1303		<i>Cholepus hoffmanii</i> , Gray. <i>Two-toed Sloth</i> .
SUB-ORDER <b>ENTOMOPHOGA</b> .		
Family MYRMECOPHAGIDÆ.		
2493		<i>Cyclothurus didactylus</i> . <i>Silky or Two-toed Ant Eater</i> .
Family DASYPODIDÆ.		
2127	2075	<i>Tatusia septum-cinctus</i> , Linn. <i>Rio Grande Armadillo</i> .
SECTION <b>Didelphia</b> .		
ORDER <b>Marsupialia</b> .		
SUB-ORDER <b>DIPROTODONTIA</b> .		
Family PHASCOLOMYIDÆ.		
2495		<i>Phascolomys ursinus</i> . <i>Wombat</i> .
Family PHALANGISTIDÆ.		
Sub-Family <i>Phascolarctinæ</i> .		
2500		<i>Phascolarctus cinerus</i> . <i>Native Bear</i> .
Sub-Family <i>Phalangistinæ</i> .		
1306 2497		<i>Phalangista vulpina</i> , Desm. <i>Australian Opossum</i> .
Family MACROPODIDÆ.		
2501		<i>Halmaturus thetidis</i> .
SUB-ORDER <b>POLYPROTODONTIA</b> .		
Family DASYURIDÆ.		
2494		<i>Dasyurus viverrinus</i> . <i>Viverrine Dasyure, Native Cat</i> .
Family DIDELPHIDÆ: <i>Opossums</i> .		
212 213 787 945	1 162 163	<i>Didelphys virginianus</i> , Shaw. <i>Common Opossum</i> .
2074		<i>Didelphys californica</i> , Ben. <i>Black Opossum</i> .

Cran.	Skel.	
		SUB-CLASS <b>Prototheria.</b>
		ORDER <b>Monotremata.</b>
		Family ECHIDNIDÆ.
	1305 2496	Echidna aculeata, Gray. <i>Porcupine Ant Eater.</i>
		Family ORNITHORHYNCHIDÆ.
	1304	Ornithorhynchus anatinus, Shaw. <i>Duck-bill Platypus.</i>

# MONSTROSITIES AND MISCELLANEOUS SPECIMENS OF AND FROM MAMMALS.

## ORDER Primates.

- No.  
644 Cast of the head of a gorilla (*Troglodytes gorilla*).  
1067 *Entozoa* found in mesenteric folds of a monkey.

## ORDER Carnivora.

### Family FELIDÆ.

- 580 A young cat (*Felis domesticus*) with two faces.  
683 A young cat (*Felis domesticus*) with two faces.  
1176 A young cat (*Felis domesticus*) with two bodies, eight legs, and one head.  
1259 A young cat (*Felis domesticus*) with cranium slightly larger than a pistol ball, without face, and with a very minute rudimentary inferior maxilla.  
1260 A young cat (*Felis domesticus*) with deformed cranium, the nasal bone forming a proboscis one inch long; a single orbit beneath the nose; the superior maxilla rudimentary; the inferior curving upwards in anterior third.  
1261 A young cat (*Felis domesticus*) with double face. In front and between the faces is a single orbit sufficiently large for two eyes; two mouths forming one cavity; inferior maxilla on anterior aspect is about one inch square.  
1321 A young cat (*Felis domesticus*) with double face.  
1368 A young cat (*Felis domesticus*) with two bodies.  
2170 A young cat (*Felis domesticus*) with two perfect bodies, one cranium, four ears, and three eyes; one eye between occipital bone.  
2184 A young cat (*Felis domesticus*) with two perfect bodies and normal cranium.  
22 Oviduct with three embryos of a cat (*Felis domesticus*).  
1270 Three embryos from a cat (*Felis domesticus*).  
1177 Organs of respiration and liver of a cat (*Felis domesticus*).  
1062 Tænia from intestines of a Canada lynx (*Lynx canadensis*).  
1591 *Entozoa* found in intestines of a cat (*Felis domesticus*).

### Family CANIDÆ.

- 1258 A young dog (*Canis familiaris*) with five legs. The right os innominatum has two acetabuli and two legs; the additional leg has two feet.  
2067 A young dog (*Canis familiaris*) with three ossa innominata and five legs.  
2153 A young dog (*Canis familiaris*) without superior or inferior maxilla, the nasal bones forming a long proboscis.  
2466 Acephalus puppy (*Canis familiaris*).  
30 Os penis of a dog (*Canis familiaris*).  
100 Os penis of a red fox (*Vulpes vulgaris pennsylvanicus*).  
767 Cervical vertebræ of a dog (*Canis familiaris*).  
1083 Os hyoides of a prairie wolf (*Canis latrans*).

- No.  
 1366 Os penis of a kit or swift fox (*Vulpes velox*).  
 72 Uterus and appendages of a dog (*Canis familiaris*).  
 1024 *Strongylus gigas* from the kidney of a dog (*Canis familiaris*).  
 2470 Fore legs of a large Irish spaniel water dog. Right fore leg fractured and united.  
 2057 Lumbricoid (?) from the liver of a dog (*Canis familiaris*).

## Family MUSTITIDÆ.

- 1041 Odoriferous glands of American skunk (*Mephitis mephitis*).  
 1423 Os penis of Missouri badger (*Taxidea americana*).

## Family PROCYONIDÆ.

- 625 Os penis of a raccoon (*Procyon lotor*).  
 1065 Os penis of a raccoon (*Procyon lotor*).

## Family URSIDÆ.

- 176 Hand of a grizzly bear (*Ursus arctos horribilis*).  
 177 Foot of a grizzly bear (*Ursus arctos horribilis*).  
 1007 Ligamentous pelvis of a grizzly bear (*Ursus arctos horribilis*).

## Family ROSMARIDÆ.

- 948 Os penis of Atlantic walrus (*Rosmarus obesus*).

## Family OTARIDÆ.

- 1045 Embryo in uterus of sea lion (*Eumetopias stelleri*), Alaska.  
 1046 Embryo of sea lion (*Eumetopias stelleri*), Alaska.  
 1047 Embryo of sea lion (*Eumetopias stelleri*), Alaska.  
 1056 Os hyoides of fur seal (*Callorhinus ursinus*), Alaska.

## ORDER Ungulata.

## Family BOVIDÆ.

- 1712 A young cow (*Bos taurus*), with six legs. The spinous processes of the second, third, and fourth dorsal vertebræ are firmly united, and form a scapula, at the upper part of which, united by a strong intraspinous ligament, is an additional pelvis, of which the lower innominatum is normal and the other only rudimentary, terminating in two irregular spinous processes. This pelvis has two additional legs; one hind leg, thirty-two inches long, with two feet hanging on the right, and one fore leg, twenty-one inches long, hanging on the left side of the thorax. The articulations of the additional legs are ankylosed.  
 2464 Two-headed foetal calf.  
 2393 Crania of a double-headed calf (*Bos taurus*).  
 2448 Double head of calf (*Bos taurus*).  
 1254 Leg of a sheep (*Ovis aries*) with three feet.  
 2222 Embryo of one month of a cow (*Bos taurus*).  
 581 Embryo of sheep (*Ovis aries*).  
 159 Costa bifida of American buffalo (*Bos americanus*).  
 160 Costa furcata of American buffalo (*Bos americanus*).  
 670 Molar teeth of an ox (*Bos taurus*).  
 1195 Os hyoides of American buffalo (*Bos americanus*).

No.				
776	Hoofs of a cow ( <i>Bos taurus</i> ).			
816	Bronchial glands and pleura of a cow ( <i>Bos taurus</i> ).			
128	Encephalon of a sheep ( <i>Ovis aries</i> ).			
638	Hair ball from the stomach of a cow ( <i>Bos taurus</i> ).			
639	Do.	do.	an ox	do.
650	Do.	do.	a cow	do.
651	Do.	do.	do.	do.
697	Do.	do.	a steer	do.
698	Do.	do.	do.	do.
699	Do.	do.	do.	do.
1068	Do.	do.	an ox	do.
804	Biliary calculus of a cow			do.
1217	Do.	do.		do.
1245	Do.	an ox		do.
1263	Do.	a cow		do.
1290	Do.	a calf		do.
1364	Do.	a Texas steer		do.
1526	Do.	a calf		do.
1557	Do.	a cow		do.
1722	Do.	a heifer		do.
1737	Hair ball from the stomach of a cow ( <i>Bos taurus</i> ).			
1996	Hair ball from the stomach of an ox ( <i>Bos taurus</i> ).			
2205	Hair ball from the stomach of a cow ( <i>Bos taurus</i> ).			
2515				

#### Family CERVIDÆ.

685	Embryo of a red deer ( <i>Cariacus virginianus</i> ).
721	Embryo of an American elk ( <i>Cervus canadensis</i> ).
676	Calvarium of an American elk ( <i>Cervus canadensis</i> ).
1181	Hairball from the stomach of an American elk ( <i>Cervus canadensis</i> ).
2237	Ball of matter rejected from the stomach of a white-tailed deer ( <i>Cariacus virginianus macrourus</i> ).

#### Family ANTILOCAPRIDÆ.

680	A young hemicephalous antelope ( <i>Antilocapra americana, dacota</i> ) with two perfect faces.
1257	Fetal cranium of antelope ( <i>Antilocapra americana</i> ). The superior maxilla is so greatly depressed anteriorly that the alveolar borders meet underneath, and have formed thereby a deep fossa instead of a palatine plate; no tongue; the inferior maxilla is extremely rudimentary and small.
1721	Embryo of antelope ( <i>Antilocapra americana</i> ).
910	Calvarium of an antelope ( <i>Antilocapra americana</i> ), exhibiting shedding of horns.

#### Family CAMELIDÆ.

805	Calculus from the stomach of a camel ( <i>Camelus dromedarius</i> ), having a pebble as nucleus.
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#### Family SUIDÆ

579	A pig ( <i>Sus scrofa</i> ) with two faces.
791	Incomplete double-headed pig ( <i>Sus scrofa</i> ).

- No.
- 853 A pig (*Sus scrofa*) with seven legs and eight feet; there are two perfect front legs, four hind legs, and a seventh leg stands upward between the two thoraces; the head is bifurcated at the os frontis, as if the animal had two mouths.
- 856 A pig (*Sus scrofa*) with two heads, the left being only partially developed.
- 1178 A pig (*Sus scrofa*) with two bodies, eight legs, and one head.
- 1189 Foot of a pig (*Sus scrofa*) with seven toes.
- 1218 Four malformed feet of a pig (*Sus scrofa*); the front feet are clubbed, with the hind toes abducted externally; the hind feet are well developed, the front toes being joined together, forming a single hoof.
- 1253 A pig (*Sus scrofa*) with eight legs, four sets of ribs, and two sterna. The two thoraces form but one cavity. One cranium, but no inferior maxillary.
- 1256 A pig (*Sus scrofa*) with malformed head, the cranium having a very small cavity for cerebellum; no facial bones; the inferior maxilla not developed.
- 1275 A pig (*Sus scrofa*) with round cranium; the proboscis is long and curved upward and backward, resting on top of the head; no orbits; no zygomatic arches, the inferior maxilla being a bridge from side to side.
- 1320 Malformed cranium of a pig (*Sus scrofa*).
- 2081 Hoof of "mule-footed pig" (*Sus scrofa*).
- 2204 Three feet of a pig (*Sus scrofa*), one with five and two with six toes.
- 1255 Skeleton of malformed pig.
- 2385 Malformed crania of a pig (*Sus scrofa*).
- 2468 Leg of a pig with three feet.
- 2472 Cranium of a deformed pig (*Sus scrofa*).
- 2473 Fore leg of a pig with two feet.
- 792 Maxillæ of a hog (*Sus scrofa*), showing milk dentition.
- 889 Right front foot of a pig (*Sus scrofa*); ligamentous.
- 890 Left hind foot of a hog (*Sus scrofa*); ligamentous.
- 906 Cranial vertebræ of a hog (*Sus scrofa*).
- 841 Generative organs of a hog (*Sus scrofa*).
- 1219 Encephalon of a pig (*Sus scrofa*).

#### Family EQUIDÆ.

- 2510 Head of a deformed foetal calf.
- 2511 Eye of same.
- 2462 Fœtus of about three months' growth delivered of a mule.
- 2467 Fœtus of a horse.
- 687 Ossicula auditus of a horse (*Equus caballus*).
- 688 Supernumerary bones of carpal articulation of a horse (*Equus caballus*).
- 692 Vertical section of phalanges of a horse (*Equus caballus*). Ligamentous preparation.
- 744 Anterior parts of maxillæ of a horse (*Equus caballus*), showing incisor teeth at four years.
- 745 Anterior parts of maxillæ of a horse (*Equus caballus*), showing incisors at six years.
- 746 Anterior parts of maxillæ of a horse (*Equus caballus*), showing incisor teeth at eight years.
- 747 Anterior parts of maxillæ of a horse (*Equus caballus*), showing incisor teeth at nine years.
- 748 Anterior parts of maxillæ of a horse (*Equus caballus*), showing incisor teeth at ten years.

- No.
- 749 Same at eleven years.
- 750 Same at twelve years.
- 751 Same at sixteen years.
- 752 Same at eighteen years.
- 753 Same at twenty years.
- 754 Left carpal articulation of a horse (*Equus caballus*); ligamentous.
- 755 Anterior phalanges of a mule (*Equus asinus caballus*) with lateral and true cartilages of the heel.
- 756 Anterior phalanges of a horse (*Equus caballus*); ligamentous.
- 757 Same.
- 758 Anterior phalanges of a horse (*Equus caballus*) articulated with rubber.
- 759 Posterior phalanges of a horse (*Equus caballus*) articulated with rubber.
- 760 Anterior phalanges of a horse (*Equus caballus*); ligamentous.
- 761 Posterior do. do. do.
- 762 Do. do. do. do.
- 769 Vertical section of os temporum of a horse (*Equus caballus*).
- 770 Right and left os temporum of a horse (*Equus caballus*).
- 777 Left tarsus and metatarsus of a horse (*Equus caballus*); ligamentous.
- 780 Ligamentous preparation of right carpus and metacarpus of a horse (*Equus caballus*).
- 781 Ligamentous preparation of left tarsus of a horse (*Equus caballus*).
- 782 Ligamentous preparation of left carpal articulation of a horse (*Equus caballus*).
- 786 Anterior parts of maxillæ of a horse (*Equus caballus*), showing alveolæ for incisor teeth.
- 798 Articulated right posterior foot of a horse (*Equus caballus*).
- 799 Articulated right anterior foot of a horse (*Equus caballus*).
- 813 Left anterior extremity of a horse (*Equus caballus*) articulated with rubber.
- 814 Left posterior extremity of a horse (*Equus caballus*) articulated with rubber.
- 2475 Portion of the foot of a fossil horse (*Equus occidentalis*).
- 689 Arteries, veins, flexor, and extensor tendons inserted into the cartilaginous hoof of a horse (*Equus caballus*) after removal of all the bones.
- 690 Cartilaginous hoof of a horse (*Equus caballus*).
- 691 Two feet of a horse (*Equus caballus*), exhibiting the laminated (sensitive) folds in healthy condition.
- 693 Right carpus of a horse (*Equus caballus*), exhibiting tendons, arteries, veins, and ligaments.
- 694 Foot of a horse (*Equus caballus*), skin removed.
- 695 Vertical section of a front and of a hind foot of a horse (*Equus caballus*).
- 696 Two feet of a horse (*Equus caballus*) prepared to exhibit the laminated (sensitive) folds, coronary border, and glandular system in healthy condition.
- 763 Internal or laminated structure of the nail or horny hoof of a horse (*Equus caballus*).
- 764 Two nails or hoofs of a horse, exhibiting the laminated structure.
- 765 Vertical sections of hoofs of a horse.
- 766 Vertical section of nail or hoof of a mule (*Equus asinus caballus*), showing thickness of wall and sole.
- 771 Four sound hoofs of a horse (*Equus caballus*) after several years' shoeing—a form of hoof remarkable for durability.
- 772 A sound hoof of a horse (*Equus caballus*) properly shod for several years.
- 773 Four sound hoofs of a horse (*Equus caballus*), four years old, never shod

- No.  
 774 An anterior and a posterior hoof of a horse (*Equus caballus*), two years old, properly shod.  
 775 Inorganic frog (*Inter-ungual cartilage*) of a horse (*Equus caballus*).  
 778 Metacarpus and phalanges of a horse (*Equus caballus*), with ligaments, flexor, and extensor tendons.  
 779 Ligamentous preparation of a foot of a horse (*Equus caballus*), with flexor and extensor tendons.  
 783 Nail phalanges with cartilaginous hoof of a horse (*Equus caballus*).  
 784 Nail phalanges or bony hoofs, in sections, of a horse (*Equus caballus*), exhibiting internal structure.  
 785 Cartilaginous sole of a hoof of a horse (*Equus caballus*).  
 808 Lower part of anterior extremity of a horse (*Equus caballus*), skin and hoof removed.  
 1209 Cast of anterior foot of a horse (*Equus caballus*), showing arteries, veins, tendons, nerves, and ligaments.  
 636 Calculus from the stomach of a horse (*Equus caballus*), with a nail as nucleus.  
 637 Hair ball from the stomach of a horse (*Equus caballus*).  
 641 Calculus from the stomach of a horse (*Equus caballus*), with a pebble for a nucleus.  
 642 Calculus from the stomach of a horse (*Equus caballus*).  
 645 Do. do. do.  
 646 Do. do. do.  
 647 Do. do. do.  
 648 Do. do. do.  
 649 Hair ball do. do.  
 661 Calculus do. do.  
 810 Intestinal calculus of a horse do.  
 1440 Do. do. do.  
 1441 Do. do. do.  
 1754 Two large urinary (?) calculi from a horse do.  
 2055 Salivary calculus from the parotid gland of a mule (*Equus asinus caballus*).

#### Family RHINOCERIDÆ.

- 640 A piece of tanned skin of a rhinoceros.

#### ORDER Cetacea.

- 1184 Penis of a whale.  
 660 Calculus found in the stomach of a whale.

#### ORDER Rodentia.

##### Family MURIDÆ.

- 1234 Encephalon of a rat (*Mus decumanus*).

##### Family CASTORIDÆ.

- 953 Five embryos of the American beaver (*Castor canadensis*).

##### Family SCIURIDÆ.

- 1411 Three embryos from a prairie dog (*Cynomys ludovicianus*).

No.

- 122 Encephalon of a gray squirrel (*Sciurus carolinensis*).

## Family CAVIIDE.

- 872 A guinea-pig (*Cavia caboya*) with rudimentary clavicles.

- 873 Caecum with portion of ileum and colon of a guinea-pig (*Cavia caboya*), exhibiting large development of vermiform process, which is six inches long and one and one quarter inches in diameter.

## Family LEPORIDÆ.

- 1755 Two uteri with embryos from a jackass rabbit (*Lepus collotis*).

- 121 Encephalon of an eastern gray rabbit (*Lepus sylvaticus*).

- 1188 *Tænia* from intestines of a marsh rabbit (*Lepus palustris*).

## ORDER Brata.

## Family DASYPODIDÆ.

- 1524 Two embryos from an armadillo.

- 1528 Skin of an armadillo.

## ORDER Marsupiallia.

## Family MACROPODIDÆ.

- 1416 Head of a foetal Kangaroo and teat of dam.

## Family DIDELPHIDÆ.

- 1220 Encephalon of an opossum (*Didelphys virginianus*).

- 1029 *Entozoa* from the stomach of an opossum.

# LIST OF CRANIA, SKELETONS, AND STERNA OF BIRDS.

*Note.*—The classification adopted is that of Dr. Elliot Coues, U. S. A., in his *Key to North American Birds*, 1872, and the nomenclature corresponds with his *Check List of North American Birds*, 1873.

## CLASS **AVES.**

### SUB-CLASS **Carinatæ**: Carinate Birds.

#### ORDER **Passeres**: Perches.

#### SUB-ORDER **OSCINES**: Singing Birds.

#### Family **TURDIDÆ**: *Thrushes*.

#### Sub-Family *Turdinæ*: Typical Thrushes.

Cran.	Skel.	Ster.	
33 50 294 295	46		<i>Turdus migratorius</i> , L. <i>Robin</i> .
296 297 298 2284 2285	2282	2283	<i>Turdus mustelinus</i> , Gm. <i>Wood Thrush</i> .
303			<i>Turdus pallasi</i> , Cab., var. <i>nanus</i> (Aud.), Cs. <i>Dwarf Thrush</i> .
304 2265 2267 2305		2266	<i>Turdus swainsoni</i> , Cab. <i>Olive-backed Thrush</i> .
		2306	<i>Turdus swainsoni</i> , Cab., var. <i>aliciae</i> (Baird), Cs. <i>Alice's Thrush</i> .
299 300 301 302			<i>Turdus fuscescens</i> , Steph. <i>Wilson's Thrush</i> ; <i>Veery</i> .
Sub-Family <i>Miminæ</i> : Mocking Thrushes.			
340 341	883		<i>Mimus polyglottus</i> (L.), Boie. <i>Mockingbird</i> .
342 343 344 345			<i>Mimus carolinensis</i> (L.), Gr. <i>Catbird</i> .

Cran.	Skel.	Ster.	
346 347 2300	45	2301	<i>Harporhynchus rufus</i> (L.), Cab. <i>Brown Thrush; Thrasher.</i>
1567			<i>Harporhynchus redivivus</i> , Cab. <i>Sickle-bill Thrush.</i>
		1478	<i>Harporhynchus curvirostris</i> (Sw.), Cab., var. <i>palmeri</i> , Ridg. <i>Curve-billed Thrush.</i>
		1465	<i>Harporhynchus crissalis</i> , Henry. <i>Red-vented Thrush.</i>
			Family SAXICOLIDÆ: <i>Stone Chats.</i>
305 306 307 2279	1109		<i>Sialia sialis</i> (L.), Haldeman. <i>Eastern Bluebird.</i>
			Family SYLVIDÆ: <i>Sylvia.</i>
			Sub-Family <i>Regulinæ</i> : <i>Kinglets.</i>
2307 2318		2319	<i>Regulus satrapa</i> , Licht. <i>Golden-crested Kinglet.</i>
2443			<i>Regulus calendula.</i> <i>Ruby-crowned Kinglet.</i>
			Sub-Family <i>Poliophtilinae</i> : <i>Gnatcatchers.</i>
355 356			<i>Poliophtila cærulea</i> , Sel. <i>Blue-gray Gnatcatcher.</i>
			Family PARIDÆ: <i>Titmice.</i>
354 2195 2288 1495		2196	<i>Lophophanes bicolor</i> (L.), Bp. <i>Tufted Titmouse.</i>
		1496	<i>Lophophanes inornatus</i> (Gamb.), Cass. <i>Plain Titmouse.</i>
		1476	<i>Lophophanes wollweberi</i> , Bp. <i>Bridled Titmouse.</i>
354 358			<i>Parus atricapillus</i> , L. <i>Black-capped Chickadee.</i>
2407 2408		2220	<i>Parus atricapillus</i> , L., var. <i>septentrionalis</i> (Harris), All. <i>Long-tailed Chickadee.</i>
1371 1372 1373 1374			<i>Parus atricapillus</i> , L., var. <i>carolinensis</i> (Aud.), Cs. <i>Carolina Chickadee.</i>
			Family SITTIDÆ: <i>Nuthatches.</i>
350 351 2198 2199		2200	<i>Sitta carolinensis</i> , Gm. <i>White-bellied Nuthatch.</i>
2398		2405	<i>Sitta carolinensis</i> , Gm., var. <i>aculeata</i> (Cass.), All. <i>Slender-billed Nuthatch.</i>
352 353			<i>Sitta canadensis</i> , L. <i>Red-bellied Nuthatch.</i>

Cran.	Skel.	Ster.	
			Family CERTHIIDÆ: <i>Creepers</i> .
	1713	1507	<i>Certhia familiaris</i> , L. <i>Brown Creeper</i> .
1516	1402	1517	<i>Campylorhynchus brunneicapillus</i> (Lafr.), Gr. <i>Brown-headed Creeper-Wren</i> .
			Family TROGLODYTIDÆ: <i>Wrens</i> .
2317			<i>Thryothorus ludovicianus</i> , Bp.
349			<i>Troglodytes ædon</i> , V. <i>House Wren</i> .
1513			<i>Troglodytes ædon</i> , V., var. <i>parkmanni</i> (Aud.), Cs. <i>Western House Wren</i> .
2439			
2308			<i>Anorthura troglodytes</i> (L.), Cs., var. <i>hyemalis</i> (Wils.), Cs. <i>Winter Wren</i> .
348			<i>Telmatodytes palustris</i> (Nils.), Cab. <i>Long-billed Marsh Wren</i> .
1348			<i>Cistothorus stellaris</i> (Licht.), Cab. <i>Short-billed Marsh Wren</i> .
			Family ALAUDIDÆ: <i>Larks</i> .
359	1434	1430	<i>Eremophila alpestris</i> (Forst.), Boie. <i>Horned Lark; Shore Lark</i> .
913			
914			
2406			
			Family SYLVICOLIDÆ: <i>American Warblers</i> .
2271	2297	2531	<i>Mniotilta varia</i> (L.), V. <i>Black-and-white Creeper</i> .
2292		2272	
2440			
309			<i>Parula americana</i> (L.), Bp. <i>Blue Yellow-backed Warbler</i> .
310			
1349		1350	<i>Helminthophaga peregrina</i> (Wils.), Cal. <i>Tennessee Warbler</i> .
2276			
2277			
2304			
321		1331	<i>Dendroeca æstiva</i> (Gm.), Bd. <i>Summer Warbler</i> .
322			
1330			
1332			
316	2313	2274	<i>Dendroeca virens</i> (Gm.), Bd. <i>Black-throated Green Warbler</i> .
2273			
315			<i>Dendroeca cærulescens</i> (L.), Bd. <i>Black-throated Blue Warbler</i> .
2444			
	2238		<i>Dendroeca cærulea</i> (Wils.), Bd. <i>Cærulean Warbler</i> .
325		2299	<i>Dendroeca coronata</i> (L.), Gr. <i>Yellow-rumped Warbler; Myrtle Bird</i> .
326			
2298			
2428			
2429			

Cran.	Skel.	Ster.	
327 2268			<i>Dendroeca blackburniæ</i> (Gm.), Bd. <i>Blackburnian Warbler.</i>
323 324 2311		2312	<i>Dendroeca striata</i> (Forst.), Bd. <i>Black-poll Warbler.</i>
317 318 2269		2270	<i>Dendroeca castanea</i> (Wils.), Bd. <i>Bay-breasted Warbler.</i>
319 320 1347 2430		2532	<i>Dendroeca pennsylvanica</i> (L.), Bd. <i>Chestnut-sided Warbler.</i>
328			<i>Dendroeca discolor</i> (V.), Bd. <i>Prairie Warbler.</i>
2290 2316 2438 2442		2291	<i>Sciurus aurocapillus</i> (L.), Sw. <i>Golden-crowned Thrush.</i>
311 312 313 314			<i>Geothlypis trichas</i> (L.), Cab. <i>Maryland Yellow Throat.</i>
1431		1432	<i>Geothlypis macgillivrayi</i> (Aud.), Bd. <i>Macgillivray's Warbler.</i>
393			<i>Icteria virens</i> (L.), Bd. <i>Yellow-breasted Chat.</i>
329 330 331 332			<i>Setophaga ruticilla</i> (L.), Sw. <i>Redstart.</i>
Family TANAGRIDÆ: <i>Tanagers.</i>			
308			<i>Pyranga rubra</i> (L.), V. <i>Scarlet Tanager.</i>
2264			<i>Pyranga æstiva</i> (L.), V. <i>Summer Redbird.</i>
1510			<i>Pyranga æstiva</i> (L.), V., var. <i>cooperi</i> (Ridg.), Cs. <i>Cooper's Tanager.</i>
1497			<i>Pyranga hepatica</i> , Sw. <i>Hepatic Tanager.</i>
Family HIRUNDINIDÆ: <i>Swallows.</i>			
1499	157	1521	<i>Hirundo horreorum</i> , Barton. <i>Barn Swallow.</i>
335 551 1013 1014	101		<i>Tachycineta bicolor</i> (V.), Cs. <i>White-bellied Swallow.</i>
333 334	2404		<i>Petrochelidon lunifrons</i> (Say), Cab. <i>Cliff Swallow; Eave Swallow.</i>

Cran.	Skel.	Steer.	
1629	2402	1630	<i>Cotyle riparia</i> (L.), Boie. <i>Bank Swallow</i> .
1514		1515	<i>Stelgidopteryx serripennis</i> (Aud.), Bd. <i>Rough-winged Swallow</i> .
1621 1622 1623	1506	1624	<i>Progne purpurea</i> (L.), Boie. <i>Purple Martin</i> .
2115			<i>Progne rubris</i> , Baird. <i>Purple Martin</i> .
			Family AMPELIDÆ: <i>Waxwings</i> .
2394 2395		2396	<i>Ampelis garrulus</i> , L. <i>Bohemian Waxwing</i> .
32 64 65 336			<i>Ampelis cedorum</i> (V.), Bd. <i>Cedar Bird</i> ; <i>Cherry Bird</i> .
			Family VIREONIDÆ: <i>Greenlets</i> .
337 338 339 2314		2315	<i>Vireo olivaceus</i> (L.), V. <i>Red-eyed Vireo</i> .
1460		1461	<i>Vireo vicinior</i> , Coues. <i>Gray Vireo</i> .
			Family LANIIDÆ: <i>Shrikes</i> .
		1474	<i>Collurio borealis</i> (V.), Bd. <i>Great Northern Shrike</i> ; <i>Butcherbird</i> .
			Family FRINGILLIDÆ: <i>Finches, etc.</i>
377 378 379 1010	593		<i>Fringilla canaria</i> , Linn. <i>Canary Bird</i> .
		1277	
	1101		<i>Pyrrhula vulgaris</i> , Cuv. <i>Bulfinch</i> .
	1110		<i>Carduelis elegans</i> , Bp. <i>Goldfinch</i> .
382 1375			<i>Carpodacus purpureus</i> (Gm.), Gr. <i>Purple Finch</i> .
2095			<i>Carpodacus cassini</i> , Baird. <i>Cassin's Purple Finch</i> .
1501	1519	1502	<i>Carpodacus frontalis</i> (Say), Gr. <i>Crimson-fronted Finch</i> ; <i>House Finch</i> .
374			<i>Loxia curvirostra</i> , L., var. <i>americana</i> (Wils.), Cs. <i>Common Crossbill</i> .
2401		2400	<i>Leucosticte tephrocotis</i> , Sw. <i>Gray-crowned Finch</i> .
2397		2399	<i>Aegiothus linaria</i> (L.), Cab. <i>Red Poll Linnet</i> .

Cran.	Skel.	Ster.	
375 376 1376	1207		<i>Chrysomitris tristis</i> (L.), Bp. <i>American Goldfinch; Yellow-bird.</i>
1493		1494	<i>Chrysomitris psaltria</i> (Say), Bp. <i>Arkansas Goldfinch.</i>
1684			<i>Plectrophanes macr冠nii</i> , Lawr. <i>McCrown's Lark Bunting.</i>
2409 2410		2533	<i>Plectrophanes nivalis</i> (L.), Meyer. <i>Snow Bunting.</i>
383 384 385 1332 1334		1335	<i>Passerculus savanna</i> (Wils.), Bp. <i>Savannah Sparrow.</i>
1663 1664 1665		1666	<i>Poocetes gramineus</i> (Gm.), Bd. <i>Baywinged Bunting.</i>
2431			<i>Poocetes gramineus</i> , var. <i>confinis</i> (Gm.), Bd. <i>Western Grass Finch.</i>
369 370	2303	2286	<i>Melospiza palustris</i> (Wils.), Bd. <i>Swamp Sparrow.</i>
392 1379 2201 2202	2130 2289		<i>Melospiza melodia</i> (Wils.) Bd. <i>Song Sparrow.</i>
976			<i>Melospiza melodia</i> (Wils.), Bd., var. <i>fallax</i> (Bd.), Ridg. <i>Gray Song Sparrow.</i>
386 387 388 389	4	2194	<i>Junco hyemalis</i> (L.), Sel. <i>Snow Bird.</i>
1518			<i>Junco cinereus</i> (Sw.), Cab., var. <i>caniceps</i> (Woodh.), Cs. <i>Cinereous Snow Bird.</i>
390 1378	2403		<i>Spizella monticola</i> (Gm.), Bd. <i>Tree Sparrow.</i>
381			<i>Spizella socialis</i> (Wils.), Bp. <i>Chipping Sparrow.</i>
1488			<i>Spizella socialis</i> (Wils.), Bp., var. <i>arizonæ</i> , Cs. <i>Arizona Chipping Sparrow.</i>
380 1447 2293 2294	2310	1448	<i>Spizella pusilla</i> (Wils.), Bp. <i>Field Sparrow.</i>
1503 1504		1505	<i>Spizella pallida</i> (Sw.), Bp., var. <i>breweri</i> (Cass.), Cs. <i>Brewer's Sparrow.</i>

Cran.	Skel.	Ster.	
371 372 373 1377		2302	<i>Zonotrichia albicollis</i> (Gm.), Bp. <i>White-throated Sparrow</i> .
2117			<i>Zonotrichia leucophrys</i> (Forst.), Sw. <i>White-crowned Sparrow</i> .
2112			<i>Chondestes grammaca</i> (Say), Bp. <i>Lark Finch</i> .
368 2262		2263	<i>Passerella iliaca</i> (Merrem.), Sw. <i>Fox Sparrow</i> .
1486 1610		1487 1611	<i>Calamospiza bicolor</i> (Townsend), Bp. <i>Lark Bunting</i> ; <i>White-winged Blackbird</i> .
367 1636 1637 1638		1639	<i>Euspiza americana</i> (Gm.), Bp. <i>Black-throated Bunting</i> .
1345 2426 2427	1136	1346	<i>Goniaphea ludoviciana</i> (L.), Bowdich. <i>Rose-breasted Grosbeak</i> .
1511 2110		1512	<i>Goniaphea melanocephala</i> (Sw.), ———. <i>Black-headed Grosbeak</i> .
391			<i>Cyanospiza cyanea</i> (L.), Bd. <i>Indigo Bird</i> .
40 360 361 362		1278	<i>Cardinalis virginianus</i> (Brisson), Bp. <i>Cardinal Redbird</i> .
363 364 365 366	2280	2281	<i>Pipilo erythrophthalmus</i> (L.), V. <i>Towhee Bunting</i> ; <i>Chewink</i> .
1489			<i>Pipilo fuscus</i> , Sw. <i>Brown Towhee</i> ; <i>Cañon Finch</i> .
			Family ICTERIDÆ: <i>American Starlings</i> .
37 79 394 395	584	1344	<i>Dolichonyx oryzivorus</i> (L.), Sw. <i>Bobolink</i> ; <i>Reedbird</i> ; <i>Ricebird</i> .
396	1325		<i>Molothrus ater</i> (Gm.), Sw. <i>Cowbird</i> .
70 397 398 399	117		<i>Agelaius phoeniceus</i> (L.), V. <i>Red-winged Blackbird</i> .
1492		1479	<i>Xanthocephalus icterocephalus</i> (Br.), Bd. <i>Yellow-headed Blackbird</i> .

Cran.	Skel.	Ster.	
400 401 402	14		<i>Sturnella magna</i> (L.), Sw. <i>Field Lark</i> ; <i>Meadow Lark</i> .
1613 1614 1615	1612	1471	<i>Sturnella magna</i> (L.), Sw. var. <i>neglecta</i> (Aud.), All. <i>Western Field Lark</i> .
403 1627		1628	<i>Icterus baltimore</i> (L.), Daudin. <i>Baltimore Oriole</i> .
1472 1520 2118		2411	<i>Icterus bullockii</i> (Sw.), Bp. <i>Bullock's Oriole</i> .
404 405 406	809		<i>Scolecophagus ferrugineus</i> (Gm.), Sw. <i>Rusty Grackle</i> .
939		1473	<i>Scolecophagus cyanocephalus</i> (Magl.), Cab. <i>Blue-headed Grackle</i> .
39 407 408 409	824	1279	<i>Quiscalus purpureus</i> (Bartr.), Licht. <i>Purple Grackle</i> ; <i>Crow Blackbird</i> .
Family CORVIDÆ: Crows.			
Sub-Family Corvinæ: Ravens and Crows.			
410 707 927 1467 1568			<i>Corvus corax</i> , Linn. <i>Raven</i> .
411			<i>Corvus cryptoleucus</i> , Couch. <i>White-necked Raven</i> .
412 413 838	133		<i>Corvus americanus</i> , Aud. <i>Common Crow</i> .
414			<i>Corvus ossifragus</i> , Wils. <i>Fish Crow</i> .
926 979 1391			<i>Picicorvus columbianus</i> (Wils.), Bp. <i>Clarke's Crow</i> .
971			<i>Gymnokitta cyanocephala</i> , Maxim. <i>Blue Crow</i> .
Sub-Family Garrulinæ: Jays.			
	1400	2102	<i>Pica melanoleuca</i> , V., var. <i>nuttalli</i> (Aud.), Cs. <i>Yellow-billed Magpie</i> .
415 416 417 418	115		<i>Cyanurus cristatus</i> (L.), Sw. <i>Blue Jay</i> .

Cran.	Skol.	Ster.	
		1469	<i>Aphelocoma floridana</i> (Bartr.), Cab., var. <i>Woodhousei</i> (Bd.) All. <i>Woodhouse's Jay</i> .
419			<i>Perisoreus canadensis</i> (L.), Bp. <i>Canada Jay</i> ; <i>Whiskey Jack</i> .
SUB-ORDER <b>Clamatores.</b>			
Family <b>TYRANNIDÆ</b> : <i>American Flycatchers.</i>			
291 292 1340 1341	1339	1342	<i>Tyrannus carolinensis</i> (L.), Bd. <i>Kingbird</i> ; <i>Bee-Martin</i> .
1642 1643 1644 1645	1641	1646	<i>Tyrannus verticalis</i> (Say). <i>Arkansas Flycatcher</i> .
2128 2287	1752	2129	<i>Sayornis fuscus</i> (Gm.), Bd. <i>Pewee Pewit</i> ; <i>Pharbe Bird</i> .
293			<i>Contopus virens</i> (L.), Cab. <i>Wood Pewee</i> .
1508	1498	1509	<i>Contopus virens</i> (L.), Cab., var. <i>richardsonii</i> (Sw.), Cs. <i>Western Wood Pewee</i> .
ORDER <b>Picariæ</b> : <i>Picarian Birds.</i>			
SUB-ORDER <b>CYPSELI</b> : <i>Cypseliform Birds.</i>			
Family <b>CAPRIMULGIDÆ</b> : <i>Goatsuckers.</i>			
	861		<i>Antrostomus vociferus</i> (Wils.), Bp. <i>Whippoorwill</i> ; <i>Night-Jar</i> .
1648 1649 1650	1647	1651	<i>Chordeiles virginianus</i> (Briss.), Bp., var. <i>henryi</i> (Cass.), All. <i>Western Night-Hawk</i> .
Family <b>CYPSELIDÆ</b> : <i>Swifts.</i>			
1500			<i>Panyptila saxatilis</i> (Woodh.), Cs. <i>White-throated Swift</i> .
	171		<i>Chætura pelagica</i> (L.), Steph. <i>Chimney Swift</i> .
Family <b>TROCHILIDÆ</b> : <i>Humming-Birds.</i>			
290			<i>Trochilus colubris</i> , L. <i>Ruby-throated Humming-Bird</i> .
1456 1457 1458		1459	<i>Trochilus alexandri</i> , Bourc. <i>Black-chinned Humming-Bird</i> .
1453 1454 2232		1455	<i>Selasphorus rufus</i> (Gm.), Sw. <i>Rufous-backed Humming-Bird</i> .
1449 1450 1451		1452	<i>Selasphorus platycercus</i> (Sw.), Gld. <i>Broad-tailed Humming-Bird</i> .

Cran.	Skel.	Ster.	
		1522	<i>Stellula calliope</i> (—), Gld. <i>Calliope Humming-Bird</i> .
			Family ALCIDINIDÆ: <i>Kingfishers</i> .
	155		<i>Ceryle alcyon</i> (L.), Boie. <i>Belted Kingfisher</i> .
			Family CUCULIDÆ: <i>Cuckoos</i> .
1466 1738		1464	<i>Geococcyx californianus</i> (Less.), Bd. <i>Ground Cuckoo</i> ; <i>Chapparral Cock</i> .
281 2441	2140		<i>Coccyzus erythrophthalmus</i> (Wils.), Bd. <i>Black-billed Cuckoo</i> .
278 279 280			<i>Coccyzus americanus</i> (L.), Bp. <i>Yellow-billed Cuckoo</i> .
			Family PICIDÆ: <i>Woodpeckers</i> .
621 718	550		<i>Hylotomus pileatus</i> (L.), Bd. <i>Pileated Woodpecker</i> ; <i>Logcock</i> .
2121			<i>Picus albolarvatus</i> (Cass.), Baird. <i>White-headed Woodpecker</i> .
	1484		<i>Picus scalaris</i> , Wagl. <i>Ladder-back Woodpecker</i> .
602 1370			<i>Picus villosus</i> , L. <i>Hairy Woodpecker</i> .
1491	1477		<i>Picus villosus</i> , L., var. <i>harrisi</i> (Aud.), All. <i>Harris' Woodpecker</i> .
282 283 2131	2197	2132	<i>Picus pubescens</i> , L. <i>Downy Woodpecker</i> .
		1475	<i>Picoides americanus</i> , Brehm., var. <i>dorsalis</i> (Bd.), All. <i>Striped-backed Woodpecker</i> .
1329 1330 2309	811	1276	<i>Sphyrapicus varius</i> (L.), Bd. <i>Yellow-bellied Woodpecker</i> .
		1397	<i>Sphyrapicus thyroideus</i> (Cass.), Bd. <i>Brown-headed Woodpecker</i> .
2295	2275	2296	<i>Centurus carolinus</i> , (L.), Bp. <i>Red-bellied Woodpecker</i> .
	1483		<i>Centurus uropygialis</i> , Bd. <i>Gila Woodpecker</i> .
2116			<i>Asyndesmus torquatus</i> (Wils.), Cs. <i>Lewis' Woodpecker</i> .
284 285 1337	1206	1338	<i>Melanerpes erythrocephalus</i> (L.), Sw. <i>Red-headed Woodpecker</i> .
286 287 288 289	118	1327	<i>Colaptes auratus</i> (L.), Sw. <i>Golden-winged Woodpecker</i> ; <i>Flicker</i> .

Cran.	Skel.	Ster.	
2079 2164		1470	<i>Colaptes mexicanus</i> , Sw. <i>Red-shafted Woodpecker</i> .
ORDER <b>Psittaci</b> : Parrots.			
Family ARIDÆ: <i>Parroquets</i> .			
277			<i>Conurus carolinensis</i> (L.), Kuhl. <i>Carolina Parroquet</i> .
Family PSITTACIDÆ: <i>Typical Parrots</i> .			
275			<i>Psittacus erythacus</i> , Linn. <i>Red-tailed Parrot</i> .
276			<i>Chrysotis ochrocephala</i> (Gm.). <i>Yellow-fronted Parrot</i> .
ORDER <b>Raptores</b> : Birds of Prey.			
Family STRIGIDÆ: <i>Owls</i> .			
1351			<i>Strix flammea</i> (L.), var. <i>americana</i> (Aud.), Cs. <i>Barn Owl</i> .
270 837	860 2144		<i>Bubo virginianus</i> (Gm.), Bp. <i>Great Horned Owl</i> .
2499			<i>Bubo maximus</i> . <i>Great Owl</i> .
274	610 2420		<i>Scops asio</i> (L.), Bp. <i>Screech Owl</i> ; <i>Mottled Owl</i> .
	603	1241	<i>Otus vulgaris</i> (L.), var. <i>wilsonianus</i> (Less.), All. <i>Long-eared Owl</i> .
273 788 2091	591		<i>Brachyotus palustris</i> (Bechst), Bp. <i>Short-eared Owl</i> .
272	156		<i>Syrnium nebulosum</i> (Forst.), Gr. <i>Barred Owl</i> .
271			<i>Nyctea nivea</i> (Daud.), Gr. <i>Snowy Owl</i> .
897			<i>Nyctale acadica</i> (Gm.), Bp. <i>Acadian Owl</i> ; <i>Saw-whet Owl</i> .
		1403	<i>Glaucidium passerinum</i> (L.), Bp., var. <i>californicum</i> (Scl.), Ridg. <i>Pygmy Owl</i> .
Family FALCONIDÆ: <i>Diurnal Birds of Prey</i> .			
268 921 2388		2392	<i>Circus cyaneus</i> (L.), Lacép., var. <i>hudsonius</i> (L.), Cs. <i>Marsh Hawk</i> ; <i>Harrier</i> .
2209			<i>Elanus leucurus</i> (V.), Bp. <i>White-tailed Kite</i> ; <i>Black-shouldered Kite</i> .
949 1294	601 2461	1295	<i>Accipiter fuscus</i> (Gm.), Bp. <i>Sharp-shinned Hawk</i> ; <i>Pigeon Hawk</i> .
266 717	800		<i>Accipiter cooperi</i> , Bp. <i>Cooper's Hawk</i> ; <i>Chicken Hawk</i> .

Cran.	Skel.	Ster.	
255	139	2225	<i>Astur atricapillus</i> (Wils.), Bp. <i>Goshawk</i> .
922			<i>Falco</i> ( <i>Hiero-falco</i> ) <i>gyrfalco</i> (Linn.), var. <i>islandicus</i> , Sabine.
2230		1386	<i>Falco mexicanus</i> (Licht.), var. <i>polyagrus</i> , Ridg. <i>Lanier Falcon</i> .
923			<i>Falco communis</i> . <i>Peregrine Falcon</i> ; <i>Duck Hawk</i> .
269			<i>Falco columbarius</i> , L. <i>Pigeon Hawk</i> .
924			
1594		1595	<i>Falco sparverius</i> , L. <i>Sparrow Hawk</i> .
2108			
263	15	2083	<i>Buteo borealis</i> (Gm.), V. <i>Red-tailed Buzzard</i> ; <i>Hen Hawk</i> .
264			
716			
2082			
1485	1369	1462	<i>Buteo borealis</i> (Gm.), V., var. <i>calurus</i> (Cass.), Ridg. <i>Western Red-tailed Buzzard</i> .
2228			
2229			
267			<i>Buteo lineatus</i> (Gm.), Jard. <i>Red-shouldered Buzzard</i> .
708			
2437			
1685	2186	1385	<i>Buteo swainsoni</i> , Bp. <i>Swainson's Buzzard</i> .
936	2080		<i>Archibuteo lagopus</i> (Brunn.), Gr., var. <i>sancti-johannis</i> (Gm.), Ridg. <i>Rough-legged Buzzard</i> .
937			
938		1463	<i>Asturina plagiata</i> , Schlegel. <i>Gray Hawk</i> .
	135		<i>Pandion haliaetus</i> (L.), Savigny. <i>Fish Hawk</i> ; <i>Osprey</i> .
891	796		<i>Aquila chrysaetus</i> , (L.). <i>Golden Eagle</i> .
1197	2085		
2353			
836	583		<i>Haliaetus leucocephalus</i> (L.), Savigny. <i>White-headed Eagle</i> ; <i>Bald Eagle</i> .
892			
893			
2107			
			Family VULTURIDÆ: <i>Old World Vultures</i> .
	2460		<i>Neophron perconopterus</i> .
			Family CATHARTIDÆ: <i>American Vultures</i> .
709	138		<i>Cathartes aura</i> (L.), Illiger. <i>Turkey Buzzard</i> .
	2459		<i>Gyparchus papa</i> .
			ORDER COLUMBÆ: <i>Pigeons</i> , etc.
			Family COLUMBIDÆ: <i>Pigeons</i> .
1490			<i>Columba fasciata</i> , Say. <i>Band-tailed Pigeon</i> .

Cran.	Skel.	Ster.	
424	958		<i>Ectopistes migratorius</i> (L.), Sw. <i>Wild Pigeon</i> .
425	114		<i>Zenaidura carolinensis</i> (L.), Bp. <i>Carolina Dove</i> .
426			
427			
428			
420	18		<i>Columba liria</i> (domestica), Linn. <i>Common Pigeon</i> .
421			
422			
423			
<b>ORDER Gallinæ: Gallinaceous Birds.</b>			
Family MELEAGRIDIDÆ: <i>Turkeys</i> .			
429	141		<i>Meleagris gallopavo</i> , L. <i>Turkey</i> .
430			
965	1390		<i>Meleagris gallopavo</i> (L.), var. <i>americana</i> (Bartr.), Cs. <i>Common Wild Turkey</i> .
966	1445		
1446			
Family PHASIANIDÆ: <i>Pheasants</i> .			
586	1044		<i>Pavo cristatus</i> , Linn. <i>Peacock</i> .
	1824		
38	41		<i>Gallus bankivi</i> , Temm. <i>Domestic Fowl</i> .
431	1365		
432			
433			
Family NUMIDIDÆ: <i>Guinea Fowls</i> .			
434	27		<i>Numida meleagris</i> , Linn. <i>Guinea Fowl</i> .
Family TETRAONIDÆ: <i>Grouse, etc.</i>			
Sub-Family <i>Tetraoninae</i> : <i>Grouse</i> .			
435			<i>Tetrao canadensis</i> , L. <i>Canada Grouse</i> ; <i>Spruce Partridge</i> .
1677			
1678			
1679			
1426	1427		<i>Centrocercus urophasianus</i> (Bp.), Sw. <i>Sage Cock</i> ; <i>Cock-of-the-Plains</i> .
1672			
1673			
1674			
436	1428		<i>Pediæcetes phasianellus</i> (L.), Ell. <i>Northern Sharp-tailed Grouse</i> .
1429			
437	140		<i>Cupidonia cupido</i> (L.), Bd. <i>Pinnated Grouse</i> ; <i>Prairie Hen</i> .
438			
439			
	126		<i>Bonasa umbellus</i> (L.), Steph. <i>Ruffed Grouse</i> ; <i>Partridge</i> ; <i>Pheasant</i> .

Cran.	Skel.	Ster.	
940			<i>Lagopus albus</i> (Gm.), Aud. <i>Willow Ptarmigan</i> .
			Sub-Family <i>Odontophorinae</i> : American Partridge.
31 77 78 440	125	1280	<i>Ortyx virginianus</i> (L.), Bp. <i>Virginia Partridge</i> ; <i>Quail</i> ; <i>Bob-white</i> .
925			<i>Oreortyx pictus</i> (Dougl.), Bd. <i>Plumed Partridge</i> .
973			<i>Lophortyx californicus</i> (Shaw), Bp. <i>California Partridge</i> .
1392	1389	1393	<i>Cyrtonyx massena</i> (Less.), Gld. <i>Massena Partridge</i> .
			ORDER <b>Grallatores</b> : Wading Birds.
			SUB-ORDER <b>LIMICOLÆ</b> : Shore Birds.
			Family <b>CHARADIIDÆ</b> : Plover.
			Sub-Family <i>Charadriinae</i> : True Plover.
868 920	867		<i>Charadrius fulvus</i> , (Gm.), var. <i>virginicus</i> (Borck.), Cs. <i>Golden Plover</i> .
606 607 991 2260	150	2261	<i>Ægialitis vociferus</i> (L.), Cass. <i>Killdeer Plover</i> .
1681 1682 1683			<i>Ægialitis asiaticus</i> (Pall.), var. <i>montanus</i> (Townsend), Coues. <i>Mountain Plover</i> .
2255 2256		2246	<i>Hæmatopus palliatus</i> , Temm. <i>Oyster-catcher</i> .
			Family <b>RECURVIROSTRIDÆ</b> : <i>Avocets</i>
1598 1599 1676 2100	1596	1387 1597	<i>Recurvirostra americana</i> , Gm. <i>Avocet</i> .
2099	1359	1552	<i>Himantopus nigricollis</i> , V. <i>Stilt</i> .
			Family <b>PHALAROPODIDÆ</b> : <i>Phalaropes</i> .
1435 1436	1640	1437	<i>Steganopus wilsoni</i> (Sab.), Cs. <i>Wilson's Phalarope</i> .
2122 2123	2120	2124	<i>Lobipes hyperboreus</i> (L.), Cuv. <i>Northern Phalarope</i> .
			Family <b>SCOLOPACIDÆ</b> : <i>Snipe, etc.</i>
449	116		<i>Philohela minor</i> (Gm.), Gr. <i>American Woodcock</i> .
450 898 1291	151	1292	<i>Gallinago wilsoni</i> (Temm.), Bp. <i>American Snipe</i> ; <i>Wilson's Snipe</i> .

Cran.	Skel.	Ster.	
1481	1480	1482	<i>Ereunetes pusillus</i> (L.), Cass. <i>Semi-palmated Sandpiper.</i>
1617 1618 1619	1616	1620	<i>Tringa minutilla</i> , V. <i>Least Sandpiper.</i>
1626			<i>Tringa bairdii</i> , Coues. <i>Baird's Sandpiper.</i>
1643 1653	1642	1654	<i>Tringa maculata</i> , V. <i>Pectoral Sandpiper.</i>
1631 1632 1633 1634		1635	<i>Tringa bonapartii</i> , Sohl. <i>White-rumped Sandpiper.</i>
451			<i>Tringa alpina</i> (L.), var. <i>americana</i> , Cas. <i>American Dunlin.</i>
456 1698	1652		<i>Limosa fedoa</i> (L.), Ord. <i>Great Marble Godwit.</i>
1607 1608 1609 2096	1605	1606	<i>Totanus semi-palmatus</i> , Gm. <i>Tattler; Semi-palmated Tattler.</i>
	1293		<i>Totanus melanoleucus</i> , Gm. <i>Greater Tell-tale.</i>
452	102		<i>Totanus flavipes</i> , Gm. <i>Yellow-Shanks.</i>
453			<i>Totanus solitarius</i> , Wils. <i>Solitary Tattler.</i>
454 455			<i>Tringoides macularius</i> (L.), Gr. <i>Spotted Sandpiper.</i>
1659 1660	1425	1661	<i>Actiturus bartramius</i> (Wils.), Bp. <i>Bartramian Sandpiper; Upland Plover.</i>
		2226	<i>Heteroscelus incanus</i> (Gm.), Coues. <i>Wandering Tattler.</i>
458 459 1079			<i>Numenius longirostris</i> , Wils. <i>Long-billed Curlew.</i>
457			<i>Numenius hudsonicus</i> , Lath. <i>Hudsonian Curlew.</i>
928 929			<i>Numenius borealis</i> (Forst.), Lath. <i>Esquimaux Curlew.</i>
SUB-ORDER <b>HERIODIONES</b> : Herons and their Allies.			
Family TANTALIDÆ: <i>Ibises, etc.</i>			
Sub-Family <i>Ibidinæ</i> : True Ibises.			
448 2097		2104	<i>Ibis falcinellus</i> , (Auct.), var. <i>ordii</i> (Bp.), All. <i>Glossy Ibis.</i>
447			<i>Ibis alba</i> (L.), V. <i>White Ibis.</i>

Cran.	Skel.	Ster.	
1016 1163			<i>Platalea ajaja</i> , L. <i>Roseate Spoonbill</i> .
1162			<i>Tantalus loculator</i> , L. <i>Wood Ibis</i> .
Family ARDEIDÆ: <i>Hérons</i> .			
Sub-Family <i>Ardeinæ</i> : <i>True Herons</i> .			
1012 2189	582	2190	<i>Ardea herodias</i> , L. <i>Great Blue Heron</i> .
2227			<i>Ardea egretta</i> , Gm. <i>Great White Egret</i> .
442			<i>Ardea leucogastra</i> , (Gm.), var. <i>leucopymna</i> (Licht.), Cs. <i>Louisiana Heron</i> .
443 444 445	1011	1281	<i>Ardea virescens</i> , L. <i>Green Heron</i> .
446			<i>Nyctiardea grisea</i> (L.), Steph., var. <i>nævia</i> (Bodd.), Allen. <i>Night Heron</i> .
	1289		<i>Botaurus minor</i> (Gm.). <i>Bittern</i> ; <i>Indian Hen</i> .
SUB-ORDER <b>ALECTORIDES</b> : <i>Cranes, Rails, etc.</i>			
Family GRUIDÆ: <i>Cranes</i> .			
2076			<i>Grus americanus</i> (L.), Ord. <i>White Crane</i> ; <i>Hooping Crane</i> .
441 1675 2098	1688		<i>Grus canadensis</i> (L.), Temm. <i>Brown Crane</i> ; <i>Sandhill Crane</i> .
Family RALLIDÆ: <i>Rails</i> .			
Sub-Family <i>Rallinæ</i> : <i>True Rails</i> .			
	2258		<i>Rallus longirostris</i> , Bodd. <i>Clapper Rail</i> ; <i>Salt-water Marsh-Hen</i> .
977			<i>Rallus virginianus</i> , L. <i>Virginia Rail</i> .
461 460			<i>Porzana carolina</i> (L.), V. <i>Carolina Rail</i> ; <i>Sora</i> ; <i>Ortolan</i> .
462 463 464	124		<i>Fulica americana</i> , Gm. <i>Coot</i> .
ORDER <b>Lamellirostres</b> : <i>Anserine Birds</i> .			
Family ANATIDÆ: <i>Swans, Geese, and Ducks</i> .			
Sub-Family <i>Cyprinæ</i> : <i>Swans</i> .			
465 901 902	12	2389	<i>Cygnus americanus</i> , Sharpless. <i>Whistling Swan</i> .
2419	1586		<i>Cygnus olor</i> , L. <i>European Swan</i> .

Cran.	Skel.	Ster.	
			Sub-Family <i>Anserinæ</i> : Geese.
920			<i>Anser hyperboreus</i> , Pall. <i>Snow Goose</i> .
466			<i>Anser ferus</i> (domesticus), Linn. <i>Common Goose</i> .
467			
468			
469	149		<i>Anser cygnoides</i> , Linn. <i>Swan Goose</i> .
473		2188	<i>Branta bernicla</i> , L. <i>Brant Goose</i> .
474			
2187			
941			<i>Branta bernicla</i> , var. <i>nigricans</i> (L.), Cs. <i>Brant Goose</i> .
470		17	<i>Branta canadensis</i> , L. <i>Canada Goose</i> ; <i>Wild Goose</i> .
471			
472			
1127			
931			<i>Branta canadensis</i> (L.), var. <i>hutchinsii</i> (Rich.), Cs. <i>Hutchins' Goose</i> .
932			
933			
			Sub-Family <i>Anatinæ</i> : River Ducks.
477	1115		<i>Anas boschas</i> , L. <i>Mallard</i> .
478			
839			
479			<i>Anas obscura</i> , Gm. <i>Dusky Duck</i> .
97		1282	<i>Anas boschas</i> (domesticus), Linn. <i>Common Duck</i> .
98		1283	
475			
476	1051		<i>Cairina moschata</i> . <i>Muscovy Duck</i> .
480	1112	1284	<i>Dafila acuta</i> (L.), Jenyns. <i>Pintail</i> ; <i>Sprigtail</i> .
481			
1691			<i>Chaulelasmus streperus</i> , L. <i>Gray Gadwall</i> ; <i>Gray Duck</i> .
1692			
1693			
1694			
486	1114		<i>Mareca americana</i> (Gm.), Steph. <i>American Widgeon</i> ; <i>Baldpate</i> .
487			
488			
935			
482	1117		<i>Querquedula carolinensis</i> (Gm.). <i>Green-winged Teal</i> .
483			
934	741		<i>Querquedula discors</i> (L.), Steph. <i>Blue-winged Teal</i> .
1668		1388	<i>Querquedula cyanoptera</i> (V.), Cass. <i>Cinnamon Teal</i> .
2106			
2119			

Cran.	Skel.	Ster.	
484 485 912 943	1122	1285	<i>Spatula clypeata</i> (L.), Boie. <i>Shoveller</i> .
489 490 491	109		<i>Aix sponsa</i> (L.), Boie. <i>Summer Duck</i> ; <i>Wood Duck</i> .
			Sub-Family <i>Fuligulinae</i> : Sea Ducks.
492			<i>Fuligula marila</i> (L.), Steph. <i>Greater Blackhead</i> .
493 494 495	1124		<i>Fuligula affinis</i> , Eyton. <i>Lesser Blackhead</i> .
496 497 498	2193		<i>Fuligula collaris</i> (Donovan), Bp. <i>Ring-necked Duck</i> .
499 500 946 947	1123		<i>Fuligula ferina</i> (L.), Sw., var. <i>americana</i> (Eyton), Cs. <i>Red-head</i> ; <i>Pochard</i> .
501 502 503 504	1125		<i>Fuligula vallisneria</i> (Wils.), Steph. <i>Canvas-back</i> .
505 506 507 508	1128	1468 1553	<i>Bucephala clangula</i> (L.), Gr. <i>Golden-eyed Duck</i> .
1695 1696		1697	<i>Bucephala islandica</i> (Gm.), Bd. <i>Barrow's Goldeneye</i> .
509 510 511 512	129		<i>Bucephala albeola</i> (L.), Bd. <i>Buffle-headed Duck</i> ; <i>Butter-ball</i> .
514 515 918	1119		<i>Harelda glacialis</i> (L.), Leach. <i>Long-tailed Duck</i> .
517			<i>Histrionicus torquatus</i> (L.), Bp. <i>Harlequin Duck</i> .
917			<i>Somateria spectabilis</i> (L.), Leach. <i>King Eider</i> .
628 1182	627		<i>Edemia fusca</i> (L.), Sw. (? var. <i>velvetina</i> , Cass). <i>Velvet Scoter</i> .
894			<i>Edemia perspicillata</i> (L.), Fleming. <i>Surf Duck</i> .
513 517 617	1111		<i>Erismatura rubida</i> (Wils.), Bp. <i>Ruddy Duck</i> .

Cran.	Skel.	Ster.	
Sub-Family <i>Mergina</i> : Mergansers.			
614	8	1286	<i>Mergus merganser</i> , L. <i>Merganser</i> ; <i>Goosander</i>
840	2009		
2391	1130	2380	<i>Mergus serrator</i> , L. <i>Red-breasted Merganser</i> .
518	1118		<i>Mergus cucullatus</i> , L. <i>Hooded Merganser</i> .
519			
Family PHENICOPTERIDÆ.			
	2498		<i>Phenicopterus antiquorum</i> . <i>Flamingo</i> .
ORDER <b>Steganopodes</b> : Totipalmate Birds.			
Family PELECANIDÆ : <i>Pelicans</i> .			
520		1690	<i>Pelecanus trachyrhynchus</i> , Lath. <i>White Pelican</i> .
1076		2093	
1689			
2092			
895			<i>Pelecanus fuscus</i> , L. <i>Brown Pelican</i> .
1087			
521			<i>Graculus carbo</i> (L.), Gray. <i>Common Cormorant</i> ; <i>Shag</i> .
1699		1701	<i>Graculus dilophus</i> (Sw.), Gray. <i>Double-crested Cormorant</i> .
1700			
		1287	<i>Graculus bicristatus</i> (Pall.), Bd. <i>Red-faced Cormorant</i> .
522			<i>Plotus anHINGA</i> , L. <i>AnHINGA</i> ; <i>Darter</i> .
ORDER <b>Longipennes</b> : Long-winged Swimmers.			
Family LARIDÆ : <i>Gulls</i> , <i>Terns</i> , etc.			
Sub-Family <i>Lestridinæ</i> : <i>Jaegers</i> , or <i>Skua Gulls</i> .			
916			<i>Stercorarius parasiticus</i> (Brunn.), Gray. <i>Richardson's Jaeger</i> .
Sub-Family <i>Larinæ</i> : <i>True Gulls</i> .			
900	1246		<i>Larus glaucescens</i> , Licht. <i>Glaucous-winged Gull</i> .
1055	826	1658	<i>Larus argentatus</i> , Brunn. <i>Herring Gull</i> ; <i>Common Gull</i> .
1657			
	153		<i>Larus delawarensis</i> , Ord. <i>Ring-billed Gull</i> .
		2101	<i>Larus delawarensis</i> , var. <i>californicus</i> (Lawe), Coues. <i>California Gull</i> .
		1248	<i>Larus tridactylus</i> , L. <i>Kittewake</i> .
525	2519	2520	<i>Larus philadelphia</i> (Ord.), Cs. <i>Bonaparte's Gull</i> .
899			
	1625		<i>Larus franklin</i> , Rich. <i>Franklin's Rosy Gull</i> .

Cran.	Skel.	Ster.	
Sub-Family <i>Sterninæ</i> : Terns.			
2248 2249 2250	2247	2251	<i>Sterna anglica</i> , Montagu. <i>Gull-billed Tern</i> ; <i>Marsh Tern</i> .
2479		2245	<i>Sterna regia</i> , Gambel. <i>Royal Tern</i> .
1702 2252 2253	1602	2254	<i>Sterna hirundo</i> , L. <i>Common Tern</i> ; <i>Sea Swallow</i> .
1602 1603 1604 2114	1600	1601	<i>Sterna forsteri</i> , Nutt. <i>Forster's Tern</i> .
1655 2105	173 2125	1656 2103	<i>Hydrochelidon fissipes</i> (L.), Gray. <i>Black Tern</i> .
Sub-Family <i>Rhynchopinæ</i> .			
2476 2477 2478	2257		<i>Rhynchops nigra</i> , L. <i>Black Skimmer</i> .
Family PROCELLARIIDÆ: Petrels.			
Sub-Family <i>Diomedeinæ</i> : Albatrosses.			
523			<i>Diomedea nigripes</i> , Aud. <i>Black-footed Albatross</i> .
Sub-Family <i>Procellariinæ</i> : True Petrels.			
524			<i>Fregetta grallaria</i> (V.), Bp. <i>White-bellied Petrel</i> .
ORDER <b>Pygopodes</b> : Diving Birds.			
Family COLYMBIDÆ: Loons.			
611	2522		<i>Colymbus torquatus</i> , Brunn. <i>Loon</i> ; <i>Great Northern Diver</i> .
944			<i>Colymbus arcticus</i> , L. <i>Black-throated Diver</i> .
526			<i>Colymbus arcticus</i> , L., var. <i>pacificus</i> (Lawr.), Cs. <i>Pacific Diver</i> .
527			<i>Colymbus septentrionalis</i> , L. <i>Red-throated Diver</i> .
Family PODICIPIDÆ: Grebes.			
2109		2090	<i>Podiceps occidentalis</i> , Lawe. <i>Western Grebe</i> .
919			<i>Podiceps griseigena</i> (Bodd.), Gray, var. <i>holbølli</i> (Reinh.), Cs. <i>Red-necked Grebe</i> .
1121	1120		<i>Podiceps cornutus</i> (Gm.), Lath. <i>Horned Grebe</i> .
720			<i>Podilymbus podiceps</i> (L.), Lawr. <i>Pied-billed Dabchick</i> .

Cran.	Skel.	Ster.	
			Family <b>ALCIDÆ</b> : <i>Auks</i> .
		1250	<i>Phaleris psittacula</i> (Pall.), Temm. <i>Paroquet Auk</i> .
		1261	<i>Simorhynchus cristatellus</i> (Pall.), Merrem. <i>Crested Auk</i> .
		1249	<i>Simorhynchus camtschaticus</i> (Lepech.), Schl. <i>Whiskered Auk</i> .
		1247	<i>Uria</i> , sp.
			<b>SUB-CLASS Ratitæ</b> : Struthious Birds.
			ORDER <b>Struthionēs</b> : Struthious Birds.
			Family <b>STRUTHIONIDÆ</b> : <i>Ostrich</i> .
	1438		<i>Struthio camelus</i> , Linn. <i>Ostrich</i> .
			Family <b>CASUARIIDÆ</b> : <i>Emeus</i> , etc.
			Sub-Family: <i>Dromainæ</i> : <i>Emeus</i> .
	1439		<i>Dromæus novæ-hollandiæ</i> , Lath. <i>Common Emeu</i> .

## MONSTROSITIES AND MISCELLANEOUS SPECIMENS OF AND FROM BIRDS.

- No.
- 1027 *Entozoa* found in gray song sparrow (*Melospiza melodia*).
- 1032 *Entozoa* found in cañon finch (*Pipilo fuscus*).
- 1034 *Entozoa* found in *vireo pusillus*.
- 2417 *Entozoa* found in the abdominal cavity of a meadow lark (*Sturnella magna*).
- 2516 *Passerculus anthinus* (In spirit).
- 2517 *Passerculus rostratus* (In spirit).
- 2518 *Chrysomitris luereucii* (In spirit).
- 127 Encephalon of a woodpecker (*Picus villosus*).
- 1039 Tongue with os hyoides in connection with the bulbi olfactorii of a woodpecker (*Hylotomus pileatus*).
- 136 Stomach of a fish-hawk (*Pandion haliaetus*).
- 594 Parasites found in trachea of bald eagle (*Haliaetus leurocephalus*).
- 1030 *Entozoa* from eye socket of swallow-tailed kite (*Nauclerus furcatus*).
- 1033 *Entozoa* found in western red-tailed buzzard (*Buteo borealis*).
- 137 Alimentary canal of a turkey buzzard (*Cathartes aura*).
- 1199 Larynx and trachea of a turkey buzzard (*Cathartes aura*).
- 158 Skeleton of a chicken (*Gallus bankivi*) with double body and one head.
- 578 Skeleton a young chicken (*Gallus bankivi*) with two additional legs attached to coccyx.
- 618 Embryo of a domestic fowl (*Gallus bankivi*).
- 842 Embryo of a domestic fowl (*Gallus bankivi*) with four legs.
- 855 Skeleton of an embryo of a domestic fowl (*Gallus bankivi*) with one head, two necks, two bodies, and four wings.
- 912 Pelvis of a chicken (*Gallus bankivi*) with a supernumerary os innominatum and four legs.
- 960 Skeleton of an malformed embryo chicken (*Gallus bankivi*). The hemicephalus cranium has two perfect faces; the cervical vertebræ are doubly thick; the two thoraces form but one cavity with two well-developed sterna; there are four wings and four legs.
- 1000 Embryo of chicken (*Gallus bankivi*) with double cranium, having two bills and three eyes.
- 1074 Skeleton of a young chicken (*Gallus bankivi*) with an additional pelvis, four legs, and two additional rudimentary wings.
- 1139 Skeleton of a chicken (*Gallus bankivi*) with three legs and four feet.
- 1179 A chicken (*Gallus bankivi*) with two bodies, four wings, four legs, and one head.
- 1180 A chicken (*Gallus bankivi*) with two bodies, four wings, four legs, and one head.
- 1264 Skeleton of a young chicken (*Gallus bankivi*) with four legs. The cranium is hemicephalus, and contains no brain; has a double inferior maxilla; there are spina bifida of the vertebral column.
- 1354 Skeleton of a chicken (*Gallus bankivi*) with an additional pelvis and two additional legs.

- No.
- 1556 Skeleton of a chicken (*Gallus bankivi*) with four legs.
- 1917 Skeleton of a chicken (*Gallus bankivi*) with three legs, the additional leg being attached to the os coccygis by two muscular bands. The bones of the additional leg are anchylosed.
- 2239 Skeleton of a young chicken (*Gallus bankivi*) with two bodies and one head.
- 2386 Egg of a Cochín-China fowl (*Gallus bankivi*), weighing about seven ounces. When opened, a full-size well-developed egg was found within.
- 2456 Four-legged chicken (*Gallus bankivi*).
- 1025 *Entozoa* from the throat of a chicken (*Gallus bankivi*) with gapes.
- 1268 Pelvis of a domestic fowl (*Gallus bankivi*).
- 1575 Two of eight eggs found in the ovaries of a chicken (*Gallus bankivi*), which carried them for two years. The eggs are thickly covered with a gelatinous substance.
- 2425 A double egg.
- 2416 Tapeworm from the intestines of a sage-cock (*Centrocercus urophasianus*), with a portion of the intestine, in which the parasite still remains.
- 2469 Tumor removed from below anus of a hen.
- 2512 Tumor removed from a hen.
- 2513 Solid ovarian tumor taken from a hen.
- 143 Alimentary canal of a turkey (*Meleagris gallopavo*).
- 643 Duplex embryo of a duck (*Anas boschas*).
- 1108 Skeleton of common duck (*Anas domesticus*) with three legs. The bones of the third leg are anchylosed.
- 1242 Cranium of a goose (*Anser domesticus*), with posterior fontanelle.
- 7 Eye of a swan (*Cygnus americanus*), with palpebral and lachrymal glands.
- 119 Encephalon of a duck (*Anas boschas*).
- 1113 Inferior larynx of a sprigtail (*Dafila acuta*).
- 1116 Organs of respiration of a mallard (*Anas boschas*).
- 1126 Inferior larynx of a canvas-back (*Fuligula rallisneria*).
- 1129 Respiratory organs of golden-eyed duck (*Bucephala clangula*).
- 1181 Respiratory organs of red-breasted merganser (*Mergus serrator*).
- 1026 *Entozoa* from the stomach of a brown pelican (*Pelicanus fuscus*).
- 1415 *Entozoa* from the horned grebe (*Podiceps cornutus*).

# LIST OF CRANIA AND SKELETONS OF REPTILIA AND BATRACHIA.

*Note.*—The classification and nomenclature adopted are substantially, according to Prof. Edward D. Cope, in his "*Check List of North American Batrachia and Reptilia*," Bull. U. S. Nat. Mus. No. 1.

## CLASS REPTILIA.

### ORDER Ophidia.

#### SUB-ORDER SOLENOGLYPHA.

Family CROTALIDÆ: *Rattlesnakes, etc.*

Cran.	Skel.	
545 615	1968	<i>Crotalus horridus</i> , Linn. <i>Banded Rattlesnake</i> ; <i>Northern Rattlesnake</i> .
1582 2214	2465 700 1966	<i>Crotalus adamanteus</i> , var. <i>adamanteus</i> (Beauv.), Cope. <i>Diamond Rattlesnake</i> .
993 1757	1758 1979	<i>Crotalus adamanteus</i> , var. <i>atrox</i> (Bd. and Gird.), Cope. <i>Sonoran Rattlesnake</i> .
	2174	<i>Crotalus lucifer</i> , Baird and Girard. <i>California Rattlesnake</i> .
2043	1980	<i>Crotalus confluentus</i> , Say. <i>Common Western Rattlesnake</i> .
2211		<i>Crotalus molussus</i> , Bd. and Girard. <i>Rattlesnake</i> .
1062 1955	1953 1978	<i>Caudisona miliaria</i> , Linn. <i>Sand Rattler</i> ; <i>Small Spotted Rattlesnake</i> .
2215	1992	<i>Caudisona tergemina</i> , Say. <i>Black Rattlesnake</i> ; <i>Prairie Rattlesnake</i> ; <i>Massassauga</i> .
	1925	<i>Ancistrodon piscivorus</i> , var. <i>piscivorus</i> (Lac.), Cope. <i>Water Moccasin</i> .
2212 2213	1903 1959	<i>Ancistrodon contortrix</i> , Bd. and Gird. <i>Moccasin</i> .
SUB-ORDER PROTEROGLYPHA.		
Family ELAPIDÆ: <i>The Vipers</i> .		
1319 1581	90	<i>Elaps fulvius</i> , var. <i>fulvius</i> (Linn.), Cope. <i>Harlequin Snake</i> ; <i>Bead Snake</i> .
1976	1956 1972	<i>Elaps fulvius</i> , var. <i>tener</i> (Baird and Girard), Cope. <i>Harlequin Snake</i> .

Cran.	Skel.	
SUB-ORDER <b>ASINEA</b> .		
Family COLUBRIDÆ: <i>Colubrine Serpents</i> .		
859	1941	<i>Carphophiops fulvus</i> , Kenn.
	94	<i>Carphophiops amœnus</i> , Say. <i>Red Snake</i> ; <i>Ground Snake</i> ;
	2029	<i>Worm Snake</i> .
	1985	<i>Haldea striatula</i> , Linn. <i>Brown Snake</i> .
	2036	<i>Tantilla gracilis</i> , Baird and Girard.
2011	1020	<i>Tantilla nigriceps</i> , Kenn.
	1946	<i>Farancia abacura</i> , Holbrook. <i>Red-bellied Horn Snake</i> .
	2038	<i>Cemophora coccinea</i> , Blumenbach. <i>Scarlet Snake</i> .
	1733	<i>Rhinochilus lecontei</i> , Baird and Girard. <i>LeConte's Snake</i> .
	1963	
1091	1945	<i>Ophibolus doliatus</i> , var. <i>coccineus</i> (Schlegel), Cope. <i>Ring Snake</i> .
	83	<i>Ophibolus doliatus</i> , var. <i>gentilis</i> (Bd. and Grd.), Cope. <i>King Snake</i> .
	1038	<i>Ophibolus doliatus</i> , var. <i>doliatus</i> (Linn.), Cope. <i>Red Snake</i> ;
		<i>Common Snake</i> .
	1961	<i>Ophibolus doliatus</i> , var. <i>triangulus</i> (Boie), Cope. <i>Milk Snake</i> ;
2021		<i>House Snake</i> ; <i>Spotted Adder</i> ; <i>Thunder and Lightning Snake</i> ;
		<i>Chicken Snake</i> .
	994	<i>Ophibolus getulus</i> , var. <i>boylii</i> (Bd. and Grd.), Cope. <i>Boyle's</i>
1090	2012	<i>Chain Snake</i> .
	1974	<i>Ophibolus getulus</i> , var. <i>sayi</i> (Holbrook), Cope. <i>Say's Chain Snake</i> .
	701	<i>Ophibolus</i> , var. <i>getulus getulus</i> (Linn.), Cope. <i>Thunder</i>
	1947	<i>Snake</i> ; <i>King Snake</i> .
	1984	
1414	2018	<i>Ophibolus polyzonus</i> .
	706	<i>Diadophis</i> , <i>punctatus</i> var. <i>punctatus</i> (Linn.), Cope. <i>Ring-</i>
	831	<i>necked Snake</i> .
	2014	
	851	<i>Diadophis punctatus</i> , var. <i>amabilis</i> (Cope), Bd. and Grd. <i>Ring-</i>
	1970	<i>necked Snake</i> .
	2044	<i>Hypsiglena ochrorhyncha</i> , Cope.
	1964	<i>Sibon annulatum</i> , var. <i>septentrionale</i> (Kenn.), Cope.
	1942	<i>Phimothyra grahamiæ</i> , Baird and Girard. <i>Graham's Snake</i> .

Cran.	Skel.	
548 1231	200 2025	<i>Cyclophis vernalis</i> , DeKay. <i>Green Snake</i> .
1975	0071	<i>Cyclophis aestivus</i> , Linn. <i>Green Snake</i> .
	1000 1009	<i>Coluber emoryi</i> , Baird and Girard. <i>Emory's Snake</i> .
	741 1341 1359	<i>Coluber vulpinus</i> , Baird and Girard. <i>Fox Snake</i> .
	0010	<i>Coluber quadrivittatus</i> , Holbrook. <i>Chicken Snake</i> .
	0018 0017	<i>Coluber obsoletus</i> , var. <i>obsoletus</i> (Say), Cope.
	1047	<i>Coluber obsoletus</i> , var. <i>confinis</i> (Say), Cope. <i>Pilot Black Snake</i> ; <i>Racer</i> .
2216	1213 1048 2011	<i>Coluber guttatus</i> , Linn. <i>Chicken Snake</i> ; <i>Spotted Racer</i> .
	1009	<i>Ptyophis sayi</i> , var. <i>sayi</i> (Schlegel), Cope. <i>Pine Snake</i> ; <i>King Snake</i> .
1112	1201 1007	<i>Ptyophissayi</i> , var. <i>mexicanus</i> , Dum. and Bib. <i>Gopher Snake</i> .
980 2047	1222 1000 1000	<i>Ptyophis sayi</i> , var. <i>bellona</i> , Bd. and Grd. <i>Bull Snake</i> .
	00	<i>Bascanium constrictor</i> (Linn.), Bd. and Grd. <i>Black Snake</i> .
1944		<i>Bascanium</i> , <i>flagelliforme</i> var. <i>flagelliforme</i> (Catesby), Cope. <i>Whip Snake</i> ; <i>Couch-whip Snake</i> .
702 982 2031	1760 1000	<i>Bascanium flagelliforme</i> var. <i>testaceum</i> (Say), Bd. and Grd.
	1510 1001	<i>Bascanium taniatum</i> , var. <i>laterale</i> (Halowell), Cope.
	1000 1000	<i>Bascanium taniatum</i> , var. <i>taniatum</i> , Halowell.
	700 0002	<i>Eutænia saurita</i> , Linn. <i>Ribbon Snake</i> ; <i>Swift Garter Snake</i> .
	1000 0008	<i>Eutænia faireyi</i> , Bd. and Gird. <i>Fairie's Garter Snake</i> .
	1004	<i>Eutænia proxima</i> , Say. <i>Say's Garter Snake</i> .
	1000 0003	<i>Eutænia radix</i> , Baird and Girard. <i>Hoy's Garter Snake</i> .

Cran.	Skel.	
	2173	<i>Eutaenia radix</i> , var. <i>twiningii</i> (Bd. and Gird.), Cs. and Yar. <i>Twining's Garter Snake</i> .
	1973	<i>Eutaenia macrosteinma</i> , var. <i>megalops</i> (Kenn.), Cope.
547	84	<i>Eutaenia marciana</i> , Bd. and Gird. <i>Marcy's Garter Snake</i> .
1233	2013	
2048		
1528	1527	<i>Eutaenia vagrans</i> (Bd. and Gird.), Cope. <i>Common Western Garter Snake</i> .
2026	2024	
	1229	<i>Eutaenia elegans</i> , Bd. and Gird. <i>Elegant Garter Snake</i> .
	1998	<i>Eutaenia ornata</i> , Baird.
	2027	
1318	85	<i>Eutaenia sirtalis</i> , var. <i>dorsalis</i> , Bd. and Gird. <i>Eastern Garter Snake</i> .
	1933	
1533	1230	<i>Eutaenia sirtalis</i> , var. <i>ordinata</i> (Linn.), Bd. and Gird.
	1936	
	2176	
546	42	<i>Eutaenia sirtalis</i> , var. <i>sirtalis</i> (Linn.), Bd. and Gird.
1228	1227	
2007	2001	
	911	<i>Eutaenia sirtalis</i> , var. <i>parietalis</i> (Linn.), Say.
1898		<i>Eutaenia sirtalis</i> , var. <i>obscura</i> (Linn.), Cope. <i>Dusky Garter Snake</i> ; <i>Black Back Garter Snake</i> .
	2030	<i>Eutaenia sirtalis</i> , var. <i>pickeringii</i> (Bd. and Gird.), Cope. <i>Pickering's Garter Snake</i> .
	1939	<i>Eutaenia cooperii</i> , Kennicott. <i>Cooper's Garter Snake</i> .
	1989	<i>Storeria occipitomaculata</i> , Storer. <i>Red-bellied Snake</i> .
2053	2033	<i>Storeria dekayi</i> , Holbrook. <i>DeKay's Brown Snake</i> .
	858	<i>Tropidonotus grahamii</i> , Bd. and Gird. <i>Graham's Water Snake</i> .
	1982	
2034	598	<i>Tropidonotus leberis</i> , Linn. <i>Yellow-bellied Snake</i> ; <i>Leather Snake</i> .
	1997	
	1950	<i>Tropidonotus fasciatus</i> , Linn. <i>Banded Water Snake</i> ; <i>Pig Snake</i> .
	1962	
	1977	
629	830	<i>Tropidonotus sipedon</i> , var. <i>sipedon</i> (Linn.), Cope. <i>Water Snake</i> ; <i>Water Adder</i> .
1949	1558	
	1214	<i>Tropidonotus sipedon</i> var. <i>woodhouseii</i> (Bd. and Gird.), Cope. <i>Woodhouse's Snake</i> .
	2006	<i>Tropidonotus sipedon</i> , var. <i>erythrogaster</i> (Shaw), Cope. <i>Red-bellied Water Snake</i> .

Cran.	Skel.	
1916 1954 1957	703 1086	<i>Heterodon platyrhinus</i> , Latreille. <i>Western Sand Viper; Blowing Hog; Viper Adder; Nose Snake.</i>
	1026	<i>Heterodon platyrhinus</i> , var. <i>atmodes</i> (Baird and Girard), Cope. <i>Hog-nose Snake; Spreading Adder.</i>
	2016	<i>Heterodon platyrhinus</i> , var. <i>niger</i> (Baird and Girard), Yarrow. <i>Black Viper; Black Adder.</i>
1582	1587 2178	<i>Heterodon simus</i> , var. <i>simus</i> (Linn.), Cope. <i>Hog-nosed Snake.</i>
1226 2000	768 1760 1986	<i>Heterodon simus</i> , var. <i>nasicus</i> (Bd. and Girard), Cope. <i>Hog-nosed Snake; Sand Viper; Western Spreading Adder.</i>
Family BOIDÆ: <i>Boas.</i>		
542 543 544		<i>Boa constrictor</i> , Linn. <i>Boa.</i>
ORDER <b>Lacertilia</b> : The Lizards.		
SUB-ORDER <b>OPHEOSAURI.</b>		
Family AMPHISBENIDÆ.		
	1910 1995	<i>Rhineura floridana</i> , Cope.
ORDER <b>Pleurodonta.</b>		
SUB-ORDER <b>LEPTOGLOSSA.</b>		
Family SCINCIDÆ: <i>Skinks.</i>		
1103	992	<i>Eumeces obsoletus</i> , Bd. and Gird. <i>Pale Lizard.</i>
998 999		<i>Eumeces guttulatus</i> , Hallowell. <i>Spotted Lizard, or Skink.</i>
2.81		<i>Eumeces skiltonianus</i> , Bd. and Gird. <i>Skilton's Skink.</i>
876 1216 1271 1272 1273 1274 2028	1215 1899	<i>Eumeces fasciatus</i> , Linn. <i>Striped Lizard; Blue-tailed Skink.</i>
Family TEIDÆ.		
91 92 541 1542 1543 1990 2004	2037	<i>Cnemidophorus sexlineatus</i> , Linn. <i>Six-lined Lizard.</i>

Cran.	Skel.	
	1902	<i>Cnemidophorus tessellatus</i> , var. <i>tigris</i> (Bd. and Gird.), Cope. <i>Tiger Lizard</i> .
1717		<i>Cnemidophorus tessellatus</i> , var. <i>tessellatus</i> (Say), Cope. <i>Tessellated Lizard</i> .
1718		
1719		
1720		
SUB-ORDER <b>DIPLOGLOSSA.</b>		
Family ANGUIDÆ: <i>The Glass Snakes.</i>		
1915	1937	<i>Opheosaurus ventralis</i> , Daudin. <i>Glass Snake.</i>
2049	1960	
Family GERRHONOTIDÆ.		
	1906	<i>Gerrhonotus multicarinatus</i> , Blainville.
Family HELODERMIDÆ.		
	166	<i>Heloderma suspectum</i> , Cope. <i>Gila Monster.</i>
	1736	
	2243	
Family IGUANIDÆ: <i>Iguanas.</i>		
	44	<i>Metapocerus cornutus</i> , Wagler. <i>South American Lizard.</i>
	1435	
1000	1907	<i>Iguana rhinolopha</i> , Wregmann.
	1444	<i>Iguana tuberculata</i> , Wagler. <i>Banded Iguana.</i>
	1908	<i>Cyclura hemilopha</i> .
	1175	<i>Iguana</i> ?
1004	684	<i>Holbrookia maculata</i> , var. <i>maculata</i> (Girard), Cope. <i>Prairie Lizard.</i>
1005		
1753	1909	<i>Sauromalus ater</i> , Dumeril. <i>Big-bellied Lizard.</i>
1921		
803	742	<i>Crotophytus collaris</i> , Say. <i>Ring-necked or collared Lizard.</i>
1584	1911	
1585	1927	
1930	1905	<i>Crotophytus wislizenii</i> , Baird and Girard. <i>Wislizenius' Lizard.</i>
2015		
	1904	<i>Dipsosaurus dorsalis</i> , Baird and Girard.
2035		<i>Uta stansburiana</i> , Baird and Girard. <i>Stansbury's Lizard.</i>
2040		<i>Sceloporus poinsetti</i> , Baird and Girard. <i>Poinsett's Lizard.</i>
88	86	<i>Sceloporus undulatus</i> , var. <i>undulatus</i> (Harlan), Cope. <i>Common Lizard; Brown Swift; Pine Tree Swift; Pine Lizard.</i>
89		
539		
540		

Cran.	Skel.	
1540 1967		Sceloporus consobrinus, Bd. and Girard. <i>Western Lizard.</i>
1442	1104 1929	Sceloporus spinosus, Wiegmann. <i>Western Spiny Lizard.</i>
2175		Sceloporus clarkii, var. clarkii (Baird and Girard), Cope. <i>Clark's Lizard.</i>
1566 2032	1565	Phrynosoma modestum, Girard. <i>Horned Toad.</i>
2218 2219	2217	Phrynosoma hernandezii, Girard.
1564 1912	1563 2045	Phrynosoma platyrhinum, Girard. <i>Horned Toad.</i>
	1555	Phrynosoma maccalli, Hallowell. <i>MacCall's Horned Lizard.</i>
	1534	Phrynosoma regale, Girard. <i>Regal Horned Lizard.</i>
538	82 1983	Phrynosoma cornutum, Harlan. <i>Horned Lizard.</i>
1443 1913 2020	1399	Phrynosoma douglassii, var. douglassii (Bell), Cope. <i>Douglas' Horned Lizard; Horned Toad.</i>
1903	1562	Phrynosoma blainvillei, Gray. <i>Blainville's Horned Lizard.</i>
1561	1559 1965	Phrynosoma coronatum, Plainville. <i>California Horned Toad.</i>
Family ANOLIDÆ.		
1914	2042	Anolis principalis, Linn. <i>Chameleon Green Lizard.</i>
ORDER Rhynchocephalia.		
Family HATTERIDÆ.		
	2502	Hatteria punctata.
ORDER Testudinata: Shield Reptiles.		
SUB-ORDER CRYPTODIRA.		
Family CHELONIIDÆ: Sea Turtles.		
528 529 577 675 1919		Thalassochelys caonana, Linn. <i>Hawksbill Turtle.</i>
530 682 789		Chelonia mydas, Schw. <i>Green Turtle.</i>

Cran.	Skel.	
2458		Chelonia caretta, Gm.
		Family CHELYDRIDÆ.
531 843 847	49	Chelydra serpentina, Linn. <i>Snapping Turtle.</i>
		Family CINOSTERNIDÆ.
666 667 668 669	674	Cinosternum pennsylvanicum, var. pennsylvanicum (Bosc), Cope. <i>Mud Turtle.</i>
		Family EMYDIDÆ: <i>Tortoises.</i>
652 653 654 655	9	Pseudemys rugosa, Shaw. <i>Red-bellied Terrapin.</i>
	1252	Pseudemys concinna, Le Conte.
532	154	Malacoclemmys palustris, Gm. <i>Salt Marsh Turtle; Diamond Back.</i>
534 535	1019	Chrysemys picta, Hern. <i>Painted Tortoise.</i>
	172	Chelopus guttatus, Schneider. <i>Yellow-spotted Turtle.</i>
533		Chelopus insculptus, Le Conte. <i>Wood Terrapin; Wood Tortoise.</i>
536 537	2	Cistudo clausa, var. clausa (Gmelin), Cope. <i>Common Land Turtle; Box Tortoise.</i>
		Family TESTUDINIDÆ.
	1580	Testudo carolina, Linn. <i>Gopher.</i>
		ORDER Crocodili.
		Family CROCODYLIDÆ.
1576 1938 2242	819 1185	Alligator mississippiensis, Daud. <i>Common Alligator.</i>

## MISCELLANEOUS SPECIMENS OF AND FROM REPTILES AND BATRACHIA.

- No.
- 1028 *Entozoa* found in a toad.
- 1188 *Tænia* from a leopard frog (*Rana halecina*).
- 96 Lungs of painted tortoise (*Chrysemys picta*).
- 844 Hyoid arch of a snapping turtle (*Chelydra serpentina*).
- 2514 Trachea of green turtle (*Chelonia mydas*).
- 2387 Deformed shell of a young water turtle.
- 87 Oviduct with eighteen embryos of eastern garter snake (*Eutania sirtalis dorsalis*).
- 1031 *Entozoa* found in a rattlesnake (*Crotalus horridus*).
- 1182 Ova of anaconda (*Boa constrictor*).
- 1225 Oviduct of water snake (*Tropidonotus sigurdsoni*), containing eighteen embryos.
- 1932 *Entozoa* found in abdominal cavity of eastern garter snake (*Eutania sirtalis dorsalis*).
- 2471 Fang of rattlesnake.
- 1183 Hyoid bone of iguana (—).
- 1535 *Entozoa* from thoracic cavity of regal horned lizard (*Phrynosoma regale*).
- 1560 Oviduct, with six ova, of a crown-horned lizard (*Phrynosoma coronatum*).
- 1590 Eggs of a horned frog (*Phrynosoma*).
- 820 Generative organs of an alligator (*Alligator mississippiensis*).
- 821 Larynx of an alligator (*Alligator mississippiensis*).
- 1186 *Entozoa* from an Alligator (*Alligator luscus*).
- 1187 Larynx, pharynx, and tongue of an alligator (*Alligator mississippiensis*).

# LIST OF CRANIA AND SKELETONS OF BATRACHIA.

*Note.*—The classification and nomenclature adopted are according to Prof. Edward D. Cope, in his "*Check List of North American Batrachia and Reptilia*," Bull. U. S. Nat. Mus. No. 1.

## CLASS **BATRACHIA.**

### ORDER **Trachystomata.**

Family **SIRENIDÆ**: *The Sirens.*

Cran.	Skel.	
	1322	<i>Siren lacertina</i> , Linn. <i>Mud Eel, or Siren.</i>
		ORDER <b>Proteida.</b>
		Family <b>PROTEIDÆ</b> : <i>The Mud Puppies.</i>
	1922	<i>Necturus lateralis</i> , Say. <i>Menobranthus</i> ; <i>Mud Puppy</i> ; <i>Water Dog</i> ; <i>Dogfish.</i>
		ORDER <b>Caduceibranchiata.</b>
		Family <b>MENOPOMIDÆ</b> : <i>The Hellbenders.</i>
1935	165 1924	<i>Menopoma allegheniense</i> , Harlan. <i>Alleghany Hellbender</i> ; <i>Big-water Lizard.</i>
	2503	<i>Sieboldia maxima.</i> <i>Great Salamander.</i>
		Family <b>AMBLYSTOMIDÆ</b> : <i>The Big Salamander.</i>
964	857 963	<i>Amblystoma mavortium</i> , Bd. <i>Spotted Salamander.</i>
	2424	<i>Amblystoma punctatum</i> , Linn. <i>Spotted Salamander.</i>
	679	<i>Amblystoma tigrinum</i> Green, <i>Azolotl.</i> <i>Tiger Salamander.</i>
		ORDER <b>Urodela.</b>
		Family <b>PLETHEDONTIDÆ</b> : <i>The Salamanders.</i>
2019	915	<i>Plethodon glutinosus</i> , Green. <i>Salamander</i> ; <i>Viscid Salamander.</i>
549 2005		<i>Spelerpes ruber</i> , var. <i>ruber</i> (Daudin), Cope. <i>Red Triton.</i>
		Family <b>DESMOGNATHIDÆ</b> : <i>The Desmognaths.</i>
2052 2054		<i>Desmognathus fusca</i> , var. <i>fusca</i> (Raf.), Cope. <i>Dusky Salamander.</i>

Cran.	Skel.	
		Family PLEURODELIDÆ: <i>The Nerots.</i>
	2046	<i>Diemictylus torosus</i> , Eschl. <i>Western Spotted Nerot or Evet.</i>
1993 2003		<i>Diemictylus miniatus</i> , var. <i>viridescens</i> (Raf.), Cope. <i>Spotted Triton; Nerot; Evet.</i>
		ORDER <b>Anura.</b>
		SUB-ORDER <b>BUFONIFORMIA.</b>
		Family BUFONIDÆ: <i>The Toads.</i>
	2179	<i>Bufo halophilus</i> , Baird.
	2172	<i>Bufo columbiensis</i> , Baird. <i>The Columbian Toad.</i>
1541	1401 2177	<i>Bufo microscaphus</i> , Cope. <i>Western Toad; Small Spade Toad.</i>
1532	1531	<i>Bufo lentiginosus</i> , var. <i>frontosus</i> (Shaw), Cope.
1539		<i>Bufo lentiginosus</i> , var. <i>cognatus</i> (Say), Cope.
	80 1943	<i>Bufo lentiginosus</i> , var. <i>americanus</i> (Le Conte), Cope. <i>American Toad.</i>
	1102 1981	<i>Bufo lentiginosus</i> , var. <i>lentiginosus</i> (Latr.), Cope. <i>Red-signed Toad.</i>
	1232	<i>Bufo quercicus</i> , Holbrook. <i>Oak Toad.</i>
		SUB-ORDER <b>FIRMISTERNIA.</b>
		Family ENGYSTOMIDÆ.
1265	93	<i>Engystoma carolinensis</i> , Holbrook. <i>Chestnut-colored Frog.</i>
		SUB-ORDER <b>ARCIFERA.</b>
		Family HYLIDÆ: <i>The Tree Frogs.</i>
	167	<i>Acris gryllus</i> , var. <i>gryllus</i> (Holbrook), Cope. <i>Southern Cricket Frog.</i>
	2039	<i>Hyla carolinensis</i> , Pennant. <i>Carolina Tree Toad.</i>
2050	2051	<i>Hyla versicolor</i> , Le Conte. <i>Common Tree Toad.</i>
		SUB-ORDER <b>RANIFORMIA.</b>
		Family RANIDÆ: <i>The Frogs.</i>
	6	<i>Rana halecina</i> , var. <i>halecina</i> (Kalm), Cope. <i>Gold-striped Frog; Shad Frog.</i>
1107	884 1940	<i>Rana palustris</i> , Le Conte. <i>Yellow-legged Frog; Marsh Frog; Pickerel Frog.</i>

Cran.	Skel.	
	60	<i>Rana catesbiana</i> , Shaw. <i>Bull Frog.</i>
	1923	
	2207	<i>Rana temporaria</i> , var. <i>silvatica</i> (Lee), Cope. <i>Swamp Frog.</i>
	2180	<i>Rana pretiosa</i> , Baird.

# LIST OF CRANIA AND SKELETONS OF FISHES.

## CLASS PISCES.

### SUB-CLASS Teleostei.

#### ORDER Pediculati.

##### Family LOPHIIDÆ.

Cran.	Skel.	
1156 1157	1164 2376	<i>Lophius piscatorius</i> , Linn. <i>Goose Fish; Fishing Frog; Sea Devil.</i>
ORDER Plectognathi.		
SUB-ORDER GYMNODONTES.		
Family DIODONTIDÆ.		
1723 1839		<i>Chilomycterus geometricus</i> (Linn.), Kaup. <i>Spring Box-fish; Rabbit Fish; Erizo; Porcupine Fish.</i>
Family TETRODONTIDÆ.		
1920	1413 1834	<i>Chilichthys turgidus</i> (Mitch.), Gill. <i>Rough Puffer; Porcupine Fish; Blower; Swell-fish; Tambour.</i>
SUB-ORDER SCALERODERMA.		
Family BALISTIDÆ.		
	1837	<i>Alutera cuspicauda</i> , De Kay. <i>Long-tailed File Fish.</i>
	1714 1821	<i>Alutera schæpffi</i> , Walb. <i>Hog Fish; File Fish.</i>
	1814	<i>Stephanolepis setifer</i> (Bennett), Gill. <i>Storer's File Fish; Fool Fish.</i>
	2345	<i>Balistes vetula</i> , Linn. <i>File Fish.</i>
ORDER Telecephali.		
SUB-ORDER HETEROSOMATA.		
Family SOLEIDÆ.		
Sub-Family Soleinæ.		
	1873	<i>Achirus lineatus</i> (Linn.), Ow. <i>American Sole; Corlico Hog-choker; Coverclip; Spotted Sole.</i>
	2347 2348	<i>Solea vulgaris</i> , Linn. <i>Sole.</i>

Cran.	Skel.	
Family <b>PLEURONECTIDÆ</b> .		
1153	13	<i>Pseudopleuronectes americanus</i> (Walb.), Gill. <i>Common Flounder</i> .
	1795 2369	<i>Pleuronectes glaber</i> (Storer), Gill. <i>Smooth Plaici; Smooth-back Flounder</i> .
	2373	<i>Glyptocephalus cynoglossus</i> (Gottsch.), Günth. <i>Craig-flounder</i> .
Sub-Family <i>Rhombinæ</i> .		
	1788	<i>Lophopsetta maculata</i> (Mitch.), Gill. <i>Spotted Turbot; Windowpane; Sand Flounder</i> .
Sub-Family <i>Hippoglossinæ</i> .		
	107 1771	<i>Chænopsetta ocellaris</i> (De Kay), Gill. <i>Long-toothed Flounder</i> .
	1785 2360	<i>Chænopsetta dentata</i> (Storer), Gill. <i>Southern Flounder</i> .
	1830	<i>Chænopsetta oblonga</i> (Mitch.), Gill. <i>Four-spotted Flounder</i> .
	2454	<i>Pleuronichthys verticalis</i> , J. and G.
152		<i>Hippoglossus americanus</i> , Gill. <i>Halibut</i> .
	2206	<i>Platysomaticthys hippoglossoides</i> (Wall.), Goode and Bean. <i>Turbot</i> .
SUB-ORDER <b>ANACANTHINI</b> .		
Family <b>GADIDÆ</b> .		
Sub-Family <i>Gadinæ</i> .		
1832		<i>Polladrius carbonarius</i> (Linn.), Bou. <i>Pollock; Cod-fish</i> .
553	111	<i>Gadus morrhua</i> , Linn. <i>Common Cod-fish</i> .
Sub-Family <i>Phycinæ</i> .		
	2368	<i>Phycis chuss</i> (Walb.), Gill. <i>Codling; Old English Hake; Squirrel Hake; Chus; Fork Beard; Ling</i> .
2363	2357	<i>Phycis tenuis</i> (Mitch.), De Kay. <i>Codling; White Hake; Squirrel Hake</i> .
	2331	<i>Urophycis regius</i> (Walb.), Gill. <i>Spotted Codling</i> .
	616 1772	<i>Microgadus tomcodus</i> (Walb.), Gill. <i>Tom Cod; Frost-fish</i> .
554	26	<i>Melanogrammus æglefinus</i> (Linn.), Gill. <i>Haddock</i> .
Sub-Family <i>Lotinæ</i> .		
	1816	<i>Lota maculata</i> (Les.). <i>Ling; Burbot; Lake Lawyer; Eelpout; Lake-cusk</i> .

Cran.	Skel.	
		Sub-Family <i>Ciliatinæ</i> .
	2387	<i>Onas cimbricus</i> (Linn.), Goode and Bean. <i>Rockling</i> .
		Sub-Family <i>Brosminæ</i> .
	626	<i>Brosmius americanus</i> , Gill. <i>European Cusk</i> ; <i>Polar Codfish</i> .
		Family MERLUCIDÆ.
	1141 1841	<i>Merlucius bilinearis</i> (Mitch.), Gill. <i>American Hake</i> .
		Family LYCODIDÆ.
		Sub-Family <i>Zoarciinæ</i> .
	1777	<i>Zoarces anguillaris</i> (Peck), Storer. <i>Eelpout</i> ; <i>Conger-eel</i> ; <i>Lamper-eel</i> .
		SUB-ORDER ACANTHOPTERI.
		Family CRYPTACANTHIDÆ.
	81 2329	<i>Cryptacanthodes maculatus</i> , Storer. <i>Ghost-fish</i> ; <i>Wry-mouth</i> .
		Family BLENNIDÆ.
	1862	<i>Muraenoides mucronatus</i> (Mitch.), Gill. <i>Common Butter-fish</i> .
		Family BATRACHIDÆ.
	1726	<i>Batrachus tau</i> (Linn.). <i>Toad-fish</i> ; <i>Oyster-fish</i> .
	1842	<i>Porichthys porosissimus</i> (Cuv. and Val.), Günth.
		Family URANOSCOPIDÆ.
2340		<i>Astroscopus anoplus</i> .
		Family GOBIIDÆ.
		Sub-Family <i>Eleotridinæ</i> .
	1863	<i>Eleotris</i> , Sp.
	1859	<i>Dormitator</i> , Sp. <i>Sleeper</i> .
		Family TRIGLIDÆ.
		Sub-Family <i>Dactylopteriinæ</i> .
	1794 2414	<i>Dactylopterus volitans</i> (Linn.), Lac. <i>Flying Robin</i> ; <i>Bat-fish</i> ; <i>Cuitta de Mare</i> .
		Sub-Family <i>Triglinæ</i> .
2356	1729 1730	<i>Prionotus evolans</i> (Linn.), Gill. <i>Lined Sea Robin</i> ; <i>Flying-fish</i> .
	2530	<i>Prionotus palmipes</i> .
	1783	<i>Prionotus carolinus</i> (Linn.), Cuv. and Val. <i>Web-fingered Sea Robin</i> ; <i>Carolina Robin</i> .

Cran.	Skel.	
		Family AGONIDÆ.
		Sub-Family <i>Leptagoninæ</i> .
2323		<i>Aspidophoroides monopterygius</i> (Bloch.), Storer. <i>Greenlander</i> .
		Family COTTIDÆ.
		Sub-Family <i>Cottinæ</i> .
	1812	<i>Cottus octodecemspinosus</i> , Mitch. <i>Slender Sculpin</i> .
		Family SCORPÆNIDÆ.
2375		<i>Sebastes marinus</i> (Linn.), Lütken. <i>Red-fish</i> ; <i>Snapper</i> .
	2452	<i>Sebastichthys mystinus</i> , J. and G.
2423		<i>Sebastichthys chlorostictus</i> , J. and G.
	2445	<i>Sebastichthys atrovirens</i> , J. and G.
	2442	<i>Sebastichthys nebulosus</i> (Ayres), Gill.
2446		<i>Sebastichthys carnatus</i> , J. and G.
	2455	<i>Sebastichthys maliger</i> , J. and G.
		Family CHIRIDÆ.
	2435	<i>Zaniolepis latipinnis</i> , Grd.
		Family LABRIDÆ.
576	54	<i>Tautoga onitis</i> (Linn.), Günth. <i>Black-fish</i> ; <i>Tautog</i> .
	1775	<i>Tautogolabrus adspersus</i> (Walb.), Gill. <i>Cunner</i> ; <i>Perch Nipper</i> .
		Sub-Family <i>Julidinae</i> .
	1858	<i>Oxyjulis modestus</i> (Grd.), Gill.
		Family EMBIOTOCIDÆ.
	2453	<i>Ditrema atripes</i> , Jor. and Gilb.
	2433	<i>Amphistichus argenteus</i> , Gill.
	1739 1740	<i>Holconotus rhodoterus</i> , Girard. <i>California Viraporous Perch</i> .
	2372	<i>Tæniotoca lateralis</i> (Agass.), A. Agass.
	2371	<i>Embiotoca jacksonii</i> , Agassiz.
		Family POMOCENTRIDÆ.
1813	1751	<i>Glyphidodon saxatilis</i> (Linn.), Cuv. and Val. <i>Cowpitot</i> ; <i>Sergeant-Major</i> .

Cran.	Skel.	
		Family ACANTHURIDÆ.
	1725	<i>Acanthurus chirurgus</i> , Bloch. and Schneider. <i>Surgeon Fish</i> ; <i>Doctor-fish</i> .
		Family CHÆTODONTIDÆ.
		Sub-Family <i>Chaetodontinae</i> .
	1762	<i>Sarothrodus binocularis</i> (Bloch.), Poey. <i>Four-eyed Fish</i> .
	1861	<i>Heros</i> , Sp.
	1773	<i>Holocanthus ciliaris</i> , Lac. <i>Isabelita</i> ; <i>Angel-fish</i> .
		Family TRICHIURIDÆ.
1711 1868 1869		<i>Trichurus lepturus</i> , Linn. <i>Silvery Hairtail</i> ; <i>Sword-fish</i> .
		Family SCARIDÆ.
1748	1743 1744	<i>Scarus radians</i> , Val. <i>Spanish Posgy</i> .
812 846		<i>Pseudoscaris guacamaia</i> (Cuv. and Val.), Günth. <i>Parrot-fish</i> .
		Family SCOMBRIDÆ.
1100	59	<i>Scomber scombrus</i> , Linn. <i>Mackerel</i> .
	2412	<i>Scomber pneumatophorus</i> , De la Roche.
		Sub-Family <i>Oreyninae</i> .
	1800	<i>Sarda pelamys</i> (Linn.), Cuv. <i>Bonito</i> ; <i>Skip-jack</i> .
1169 1170	1168	<i>Oreynus thynnus</i> (Linn.), Goode. <i>Horse Mackerel</i> .
2378		<i>Euthynnus pelamys</i> (Linn.), Lütken. <i>Oceanic Bonito</i> .
1092	790	<i>Cybbium maculatum</i> (Mitch.), Cuv. <i>Spanish Mackerel</i> .
		Family CARANGIDÆ.
		Sub-Family <i>Vomerinae</i> .
	1769	<i>Vomer setipinnis</i> (Mitch.), Ayres. <i>Horse-fish</i> ; <i>Jorobado</i> .
	1894	<i>Selene vomer</i> (?) (Lac.), Lütken. <i>Jorobado Horseman</i> .
	1715	<i>Selene capillaris</i> , Mitch. <i>Moon-fish</i> .
		Sub-Family <i>Caranginae</i> .
	1801	<i>Decapterus punctatus</i> (Ag.), Gill. <i>Dotted Scad</i> ; <i>Round Robin</i> .
	1838	<i>Trachurops crumenophthalmus</i> (Bloch.), Gill. <i>Big-eyed Scad</i> ; <i>Chicharro</i> ; <i>Goggler</i> ; <i>Goggle-eyed Jack</i> .

Cran.	Skel.	
	1825	<i>Paratractus pisquestus</i> (Cuv. and Val.), Gill. <i>Yellow Crevallè; Jack; Buffalo Jack.</i>
1888	1822 1828	<i>Carangus hippos</i> (Linn.), Gill. <i>Horse Crevallè; Jiguagua.</i>
	1768	<i>Blepharichthys crinitus</i> (Ackerly), Gill. <i>Thread-fish; Taylor.</i> Sub-Family <i>Trachynotinae</i> .
	1716	<i>Trachynotus ovatus</i> (Linn.), Günth. <i>Short Pompano.</i>
	1211 1761 1820	<i>Trachynotus carolinus</i> (Linn.), Gill. <i>Pompano; Crevallè.</i>
	1811	<i>Halatractus zonatus</i> (Mitch.), Gill. <i>Rudder-fish; Bonito.</i> Family <i>CORYPHAENIDÆ</i> .
	1881	<i>Coryphæna sueuri</i> , Cuv. and Val. <i>Lesueur's Dolphin.</i> Family <i>STROMATEIDÆ</i> . Sub-Family <i>Centrolophinae</i> .
	1829	<i>Palinurichthys perciformis</i> (Mitch.), Gill. <i>Black Rudder-fish.</i> Sub-Family <i>Stromateinae</i> .
	1774 1831	<i>Poronotus triacanthus</i> (Peck), Gill. <i>Harvest-fish; Butter-fish.</i>
	1778	<i>Peprilus gardenii</i> (Bloch., Schneider), Gill. Family <i>LATILIDÆ</i> .
	2432	<i>Caulolatilus anomalus</i> , Gill. Family <i>BERYCIDÆ</i> . Sub-Family <i>Holocentrinae</i> .
1750	1746 1749	<i>Holocentrum sogo</i> , Bloch. <i>Squirrel-fish.</i>
		Family <i>SCIAENIDÆ</i> .
1190	1146	<i>Cynoscion carolinensis</i> (Cuv. and Val.), Gill. <i>Spotted Sea Trout.</i>
558	105 110	<i>Cynoscion regalis</i> (Bloch.), Gill. <i>Squeteague; Weakfish; Gray Trout.</i>
	2450	<i>Roncador stearnsii</i> , J. and G. Sub-Family <i>Haplodontinae</i> .
	1579 1796	<i>Haplodontus grunniens</i> , Raf. <i>Lake Sheepshead; White Perch; Grunter; Drum.</i>
120	1096	<i>Pogonias chromis</i> , Lacep. <i>Drum; Oyster Drum.</i>

Cran.	Skel.	
878	877	<i>Liostomus xanthurus</i> , Lacep. <i>Yellow Tail; Spot.</i>
886	885	
887	2332	<i>Liostomus obliquus</i> (Mitch.), De Kay. <i>LaFayette; Goody; Chub; Roach.</i>
		Sub-Family <i>Sciæninæ</i> .
559	142	<i>Sciænops ocellatus</i> (Linn.), Gill. <i>Red Bass; Bass; Sea Bass; Redfish; Ocellated Drum.</i>
	1855	<i>Bairdella punctata</i> (Linn.), Gill. <i>Silver Perch.</i>
1149	1145	<i>Menticurrua nebulosus</i> (Mitch.), Gill. <i>Kingfish; Whiting;</i>
1151	1154	<i>Hake; Barb.</i>
	1782	
2434		<i>Menticurrua undulatus</i> (Grd.), Gill.
	1846	<i>Menticurrua littoralis</i> (Hall), Gill. <i>Shore Whiting.</i>
1147	1144	<i>Micropogon undulatus</i> (Linn.), Cuv. and Val. <i>Croaker.</i>
	2349	
		Family GERRIDÆ.
	1804	<i>Eucinostomus lefroyi</i> , Goode. <i>Long-boned Shad.</i>
		Family PIMELEPTERIDÆ.
1770	1745	<i>Pimelepterus bosci</i> , Lac. <i>Chopabanka; Bream.</i>
		Family SPARIDÆ.
		Sub-Family <i>Sparinæ</i> .
	1892	<i>Lagodon rhomboides</i> (Linn.), Holb. <i>Sargo.</i>
574	61	<i>Archosargus probatocephalus</i> (Walb.), Gill. <i>Sheephead.</i>
	1781	
	2341	<i>Sargus holbrookii</i> , Bean.
1202	1201	<i>Stenotomus argyrops</i> (Linn.), Gill. <i>Scup; Porgy.</i>
1203	1212	
1204	1776	
		Family PRISTOPOMATIDÆ.
	2361	<i>Orthopristis fulvomaculatus</i> (Mitch.), Gill.
	1843	<i>Hæmulon xanthopteron</i> , Cuv. and Val. <i>Grunt.</i>
	1891	<i>Hæmulon flaviguttatus</i> , Gill. <i>Yellow-spotted Grunt.</i>
1871		<i>Hæmulon</i> , Sp.
	2352	<i>Rhomboplites aurorubens</i> (Cuv. and Val.), Gill. <i>Bastard Snapper.</i>

Cran.	Skel.	
		Sub-Family <i>Lutjaninæ</i> .
	1798	<i>Lutjanus caxis</i> (Bloch and Snneider), Gill. <i>Gray Snapper</i> .
	2165	<i>Lutjanus blackfordi</i> , Goode and Bean. <i>Blackford's Red Snapper</i> .
		Family SERRANIDÆ.
		Sub-Family <i>Serraninæ</i> .
	1792	<i>Epinephelus striatus</i> (Bloch), Gill. <i>Hamlet; Grouper</i> .
	1806	<i>Epinephelus guttatus</i> (Gmelin), Goode. <i>Hind</i> .
	2354	<i>Epinephelus morio</i> (Cuv.), Gill. <i>Red Grouper</i> .
575	11	<i>Centopristis atrarius</i> Linn. <i>Black Sea Bass</i> .
1835	1734	
		Family ETHEOSTOMIDÆ.
	2415	<i>Diplesium blennoides</i> (Raf.), Jordan. <i>Green-sided Darter</i> .
		Family PERCIDÆ.
568	24	<i>Perca americana</i> , Schranck. <i>Yellow Perch</i> .
	1833	
	1884	
2355	148	<i>Stizostethium virtreum</i> (Mitch.), Jor. and Copeland. <i>Pike</i>
	1875	<i>Perch</i> .
1741	2333	<i>Stizostethium griseum</i> (De Kay), Milner. <i>Sauger; Gray Pike; Perch</i> .
	170	<i>Percina caprodes</i> (Raf.), Girard. <i>Hog-fish</i> .
	74	<i>Boleichthys fusiformis</i> (Girard), Jor. <i>Darter</i> .
		Family LABRACIDÆ.
558	23	<i>Morone americana</i> (Gmelin), Gill. <i>White Perch</i> .
	1870	<i>Paralubrax clathratus</i> , Grd.
43	3	<i>Roccus lineatus</i> (Bl., Schn.), Gill. <i>Striped Bass; Rockfish</i> .
	1872	<i>Roccus chrysops</i> (Raf.), Gill. <i>White Bass; Star-fish; Lake Bass</i> .
		Family CENTRARCHIDÆ.
865	5	<i>Lepomis auritus</i> (Linn.), Gill. <i>Long-eared Sunfish</i> .
	1886	
	1883	<i>Lepomis pallidus</i> (Mitch.), Gill and Jord. <i>Pale Sunfish</i> .
	1893	<i>Lepomis apiatus</i> , Cope. <i>Fly-specked Sunfish</i> .
	1854	<i>Lepomis sanguinolentus</i> (Ag.), Jordan. <i>Blue and Orange Sunfish; Sun Perch</i> .

Cran.	Skel.	
1747	815	<i>Eupomotis aureus</i> (Walb.), Gill and Jordan. <i>Common Sunfish Pumpkin-seed; Tobacco-box.</i>
	1735	
	1889	<i>Eupomotis spinosus</i> (Holb.), Gill. <i>Southern Sunfish.</i>
1150	817	<i>Enneacanthus obesus</i> (Grd.), Gill. <i>Mottled Sunfish.</i>
	1890	<i>Chaenobrittus viridis</i> (Cuvr. and Val.), Jordan. <i>Green Sunfish.</i>
	2330	<i>Telipomus cyanellus</i> , Raf. <i>Blue Spotted Sunfish.</i>
	2413	<i>Centrarchus irrideus</i> , Cuv. and Val. <i>Shining Bass.</i>
	823	<i>Pomoxys nigromaculatus</i> (Le S.), Grd. <i>Grass Bass; Calico Bass; Bar-fish; Strawberry Bass; Bitter Head.</i>
	1779	
	2335	<i>Pomoxys annularis</i> , Raf. <i>Crappie; Bachelor.</i>
1799	147	<i>Micropterus dolamieu</i> (Lac.), Gill. <i>Small-mouthed Black Bass; Black Bass.</i>
	1789	
1787	1142	<i>Micropterus salmoides</i> (Lac.), Vaill and Boc. <i>Oswego Bass; Large-mouthed Black Bass.</i>
	1877	<i>Ambloplites rupestris</i> (Raf.), Gill. <i>Rock Bass; Goggle-eye; Red-eye.</i>
		Family EPHIPPIIDÆ.
850	68	<i>Chætodipterus gigas.</i>
1876		<i>Chætodipterus quadratus</i> (Gm.), Gill. <i>Moon-fish.</i>
		Family POMATOMIDÆ.
67	63	<i>Pomatomus saltatrix</i> (Linn.), Gill. <i>Mackerel; Skipjack; Horse Mackerel; Green Fish; Taylor; Snapping Mackerel.</i>
555		
1158		
		Family AMMODYTIDÆ.
	1865	<i>Ammodytes americanus</i> , De Kay. <i>Sandlance; Sand-eel.</i>
		Family ECHEINEIDIDÆ.
2369	71	<i>Leptecheneis naucratus</i> (Zuiew.), Gill. <i>Sucker.</i>
		Family SPHYRÆNIDÆ.
	1815	<i>Sphyræna borealis</i> , De Kay. <i>Northern Burricuda.</i>
		SUB-ORDER PERSESOCES.
		Family MUGILIDÆ.
	1887	<i>Mugil</i> , Sp.
1880		<i>Mugil cephalotus</i> (?)
		Family ATHERINIDÆ.
882	1767	<i>Chirostoma notata</i> (Mitch.), Gill. <i>Silversides.</i>

Cran.	Skel.	
<b>SUB-ORDER SYNENTOGNATHI.</b>		
Family BELONIDÆ.		
562	55	<i>Belone longirostris</i> (Mitch.), Gill. <i>Silver Gar</i> ; <i>Bell-fish</i> .
2350		<i>Belone latimanus</i> , Poey. <i>Gar-fish</i> .
Family SCOMBERESOCIDÆ.		
	1054	<i>Exocætus exiliens</i> , Gmelin. <i>Flying-fish</i> .
	2451	<i>Exocætus californicus</i> , Cooper.
	1793	<i>Hemirhampus pleii</i> , Val. <i>Red-billed Gar</i> .
	1840	<i>Scomberesox scutellatus</i> , Le S. <i>Skipper</i> ; <i>Saury</i> ; <i>Skip-jack</i> .
<b>SUB-ORDER HEMIBRANCHI.</b>		
Family GASTEROSTEIDÆ.		
Sub-Family <i>Gasterosteinae</i> .		
	1850	<i>Gasterosteus biaculeatus</i> , Shaw. <i>Two-spined Stickleback</i> .
	2325	<i>Gasterosteus pungitius</i> , Linn.
	1867	<i>Apeltes quadracus</i> (Mitch.), Brei. <i>Four-spined Stickleback</i> .
<b>ORDER Haplomi.</b>		
Family ESOCIDÆ.		
	1817	<i>Esox nobilior</i> , Thompson. <i>Muskallunge</i> ; <i>Great Pike</i> .
609	146 1809	<i>Esox lucius</i> , Linn. <i>Lake Pike</i> ; <i>Mascalunge</i> .
1790		<i>Esox americanus</i> , Lac. <i>Banded Pickerel</i> ; <i>Trout Pickerel</i> .
557	16	<i>Esox reticulatus</i> , Lesueur. <i>Pickerel</i> .
Family CYPRINODONTIDÆ.		
1133	880	<i>Fundulus heteroclitus</i> (Linn.), Gill. <i>Mummahog</i> .
	103	<i>Fundulus</i> , Sp. <i>Baird's Stone-tugger</i> .
	1763 1764	<i>Fundulus pisculentus</i> (Mitch.), Val. <i>Mummahog</i> ; <i>Minnow</i> .
1766	881 1765	<i>Hydrargyra majalis</i> (Walb.), Val. <i>Mummahog</i> .
Family UMBRIDÆ.		
	1848	<i>Melanura limi</i> (Kirt.), Ag. <i>Mud-minnow</i> ; <i>Mud-dace</i> ; <i>Dog-fish</i> .

Cran.	Skel.	
		<b>ORDER Isospondyli.</b>
		Family SYNODONTIDÆ.
1847		<i>Synodus foetens</i> (Linn.), Gill. <i>Snake-fish.</i>
		Family MICROSTOMIDÆ.
	1064	<i>Osmerus mordax</i> (Mitch.), Gill. <i>Smelt.</i>
	2321	<i>Osmerus pacificus.</i> <i>Pacific Smelt.</i>
		Family SALMONIDÆ.
2362		<i>Oncorhynchus quinnat</i> (Rich.), Günther. <i>California Columbian or Quinnat Salmon.</i>
	2421	<i>Oncorhynchus kisutch</i> (Walb.), Jordan and Gill. <i>Salmon.</i>
	2058	<i>Salmo spilurus</i> , Cope.
	2367	<i>Salmo sebago</i> , Girard. <i>Land-locked Salmon.</i>
	1885	<i>Salvelinus ognassa</i> (Grd.), Gill and Jor. <i>Blue-backed Trout.</i>
571	58	<i>Salvelinus fontinalis</i> (Mitch.), Gill and Jor. <i>Brook Trout.</i>
	1845	
1288	144	<i>Cristivomer namaycush</i> (Walb.), Gill and Jor. <i>Lake Trout.</i>
	1578	<i>Thymallus tricolor</i> , Cope. <i>Grayling.</i>
	131	<i>Coregonus clupeiformis</i> (Mitch.), Milner. <i>White-fish.</i>
		Family ALEPIDOSAURIDÆ.
2364		<i>Alepidosaurus ferox</i> , Lowe. <i>Lancet-fish.</i>
		Family ALBULIDÆ.
	1780	<i>Albula conrhynchus</i> , Bl. and Schn. <i>Lady-fish.</i>
	2365	
		Family ELOPIDÆ.
	1802	<i>Elops saurus</i> , Linn. <i>Big-eyed Herring.</i>
	1140	<i>Megalops thrissoides</i> (Bl., Sch.), Günther. <i>Jew-fish; Tarpum.</i>
		Family DUSSUMIERIDÆ.
1866		<i>Etrumeus teres</i> (De Kay), Brevoort. <i>Round Herring.</i>
		Family HYODONTIDÆ.
	1797	<i>Hyodon tergisus</i> , Le S. <i>Moon-eye; Silver Bass; Toothed Herring.</i>
		Family CLUPEIDÆ.
	1791	<i>Brevoortia tyrannus</i> (Lat.), Goode. <i>Menhaden; Mossbunker; Hardhead; Bonyfish; Bunker; White-fish; Fatback; Yellow-tail; Brig-fish.</i>

Cran.	Skel.	
	2358	<i>Brevoortia patronus</i> , Goode. <i>Alewife</i> .
570	36	<i>Alosa sapidissima</i> (Wilson), Storer. <i>Shad</i> .
1879		<i>Opisthronema thrissa</i> , Gill. <i>Thread Herring</i> ; <i>Menhaden</i> .
1070	1078	<i>Pomolobus pseudoharengus</i> (Wilson), Gill. <i>Herring</i> ; <i>Alewife</i>
1071		<i>Sawbelly</i> ; <i>Spring Herring</i> ; <i>Blueback</i> .
1072		
1073		
	1786	<i>Pomolobus medioeris</i> (Mitch.), Gill. <i>Tailor Herring</i> ; <i>Fall Shad</i> .
	1807	<i>Clupea harengus</i> , Linn. <i>English Herring</i> .
		Family DOROSOMATIDÆ.
567	108	<i>Dorosoma cepedianum</i> (Lac.), Gill. <i>Toothed Herring</i> .
		Family ENGRAULIDÆ.
	1857	<i>Engraulis</i> , Sp.. <i>Anchovy</i> .
		ORDER <b>Eventognathi</b> .
		Family CATOSTOMIDÆ.
572	57 1844	<i>Hypentelium nigricans</i> (Le S.), Jord. <i>Hog Sucker</i> ; <i>Stoneroller</i> .
662	659	<i>Catostomus commersonii</i> (Lac.), Jord. <i>Chub-sucker</i> .
663	1731	
664	2346	
665		
1856		<i>Catostomus longirostrum</i> , Le S. <i>Long-nosed Sucker</i> .
	1805	<i>Erimyzon sucetta</i> (Lac.), Jord. <i>Creek-fish</i> ; <i>Chub-sucker</i> ;
807	806	<i>Yellow Mullet</i> ; <i>Horned Sucker</i> .
	66	<i>Carpiodes</i> , Sp.
		Family CYPRINIDÆ.
569	28	<i>Carassius auratus</i> , Bleeker. <i>Goldfish</i> .
	1742	<i>Cyprinus carpio</i> (Linn.). <i>Carp</i> .
	169	<i>Semotilus corporalis</i> (Mitch.), Putnam. <i>Common Chub</i> ;
	1853	<i>Horned Dace</i> ; <i>Creek Chub</i> .
573	585	<i>Semotilus bullaris</i> (Raf.), Jordan. <i>Fall-fish</i> ; <i>Chub</i> ; <i>Roach</i> ;
866	1874	<i>Swamp Carp</i> .
560	75	<i>Hybognathus regius</i> , Girard. <i>Gudgeon</i> ; <i>River Smelt</i> .
864	168	<i>Luxilus cornutus</i> (Mitch.), Jordan. <i>Shiner</i> ; <i>Redfin</i> ; <i>Rough-</i>
	1851	<i>head</i> ; <i>Rouch</i> ; <i>Rot-gut</i> .

Cran.	Skel.	
	73	<i>Luxilus analostanus</i> , Grd. <i>Gold-striped Dace</i> ; <i>Silverside</i> .
	2338	<i>Idus melanotus</i> , Heskcl. <i>The Ide</i> .
	879 1849	<i>Hybopsis hudsonius</i> (Clinton), Putnam. <i>Spawn-eater</i> .
588	592	<i>Ceratichthys biguttatus</i> (Kirkland), Grd. <i>Horned Chub</i> ; <i>Horny-headed Jerker</i> ; <i>River Chub</i> .
	1852 1897	<i>Rhinichthys cataractæ</i> (Val.), Jordan. <i>Long-nosed Dace</i> ; <i>Niagara Gudgeon</i> .
	599 1724 1810	<i>Notemigonus chrysoleucus</i> (Mitch.), Jordan. <i>Shiner</i> ; <i>Gobler Shiner</i> .
	587	<i>Esoglossum masillingua</i> (Lesueur). <i>Tongue-jaw</i> ; <i>Day Chub</i> ; <i>Cutlips</i> ; <i>Nigger Chub</i> .

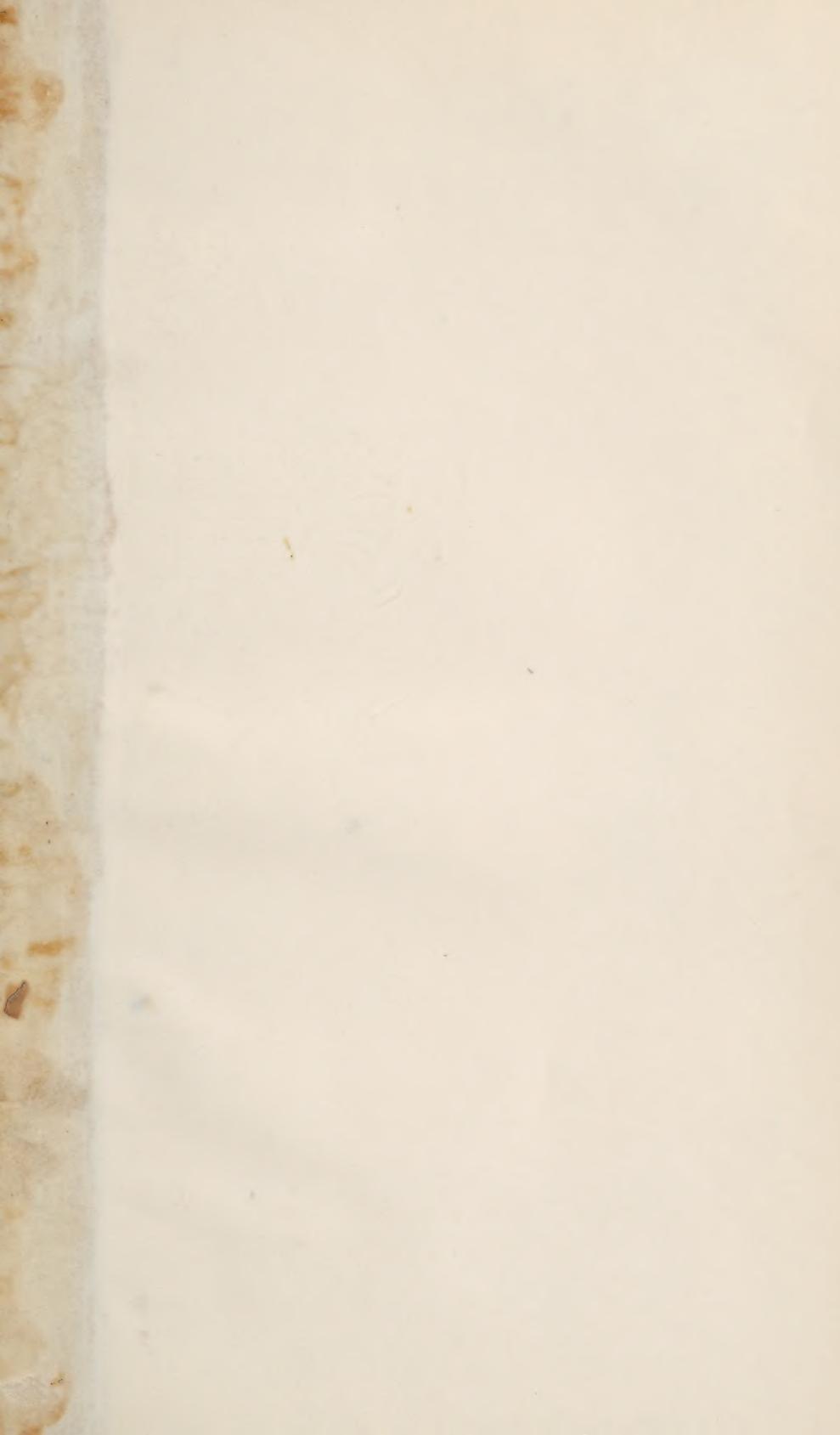
ORDER **Nimatognathi.**Family **SILURIDÆ.**

	1882	<i>Ictalurus punctatus</i> (Raf.), Jordan. <i>Channel Cat</i> ; <i>Blue Cat</i> ; <i>White Cat</i> .
	1727 1728 2336	<i>Amiurus albidus</i> (Le S.), Gill. <i>Fork-tailed Catfish</i> ; <i>Channel Cat of the Potomac</i> .
	1784	<i>Amiurus lophius</i> (Grd.), Gill. <i>Big-mouthed Catfish</i> .
	1836	<i>Amiurus nebulosus</i> , Le S.
563 564	21	<i>Amiurus nigricans</i> (Le S.), Gill. <i>Lake Catfish</i> ; <i>Black Catfish</i> ; <i>Great Mississippi Cat</i> .
	2322	<i>Amiurus melas</i> (Raf.), Jord. and Cope. <i>Small Black Catfish</i> .
	2339	<i>Amiurus natalis</i> , var. <i>lividus</i> (Le S.), Raf. <i>Catfish</i> ; <i>Yellow Cat</i> .
	1143	<i>Amiurus acutus</i> (L.), Gill. <i>Black Catfish</i> ; <i>Horned Pout</i> ; <i>Bullhead</i> ; <i>Minister</i> .
	1860	<i>Noturus insignis</i> (Rich.), Gill and Jord. <i>Margined Stone Cat</i> .
	2326	<i>Noturus exilis</i> , Nelson. <i>Slender Stone Cat</i> .
	2324	<i>Noturus gyrinus</i> (Mitch.), Raf. <i>Tadpole Stone Cat</i> .
	2351	<i>Arius milberti</i> (Val.), Gill. <i>Sea<sup>2</sup> Catfish</i> .
	51	<i>Rhumdia brachypterus</i> (Cope), Gill. <i>Mexican Catfish</i> .

Cran.	Skel.	
<b>ORDER Apodes.</b>		
<b>SUB-ORDER ENCHELYCEPHALI.</b>		
Family CONGRIDÆ.		
Sub-Family <i>Congrinæ</i> .		
	2344	<i>Conger oceanica</i> (Mitch.), Gill. <i>Conger Eel</i> .
Family ANGUILLIDÆ.		
1094	25	<i>Anguilla vulgaris</i> , Fleming. <i>Common Eel</i> .
1095	1105	
2244	2210	<i>Muraenopsis tridactylus</i> , Cuv.
Family MURÆNIDÆ.		
	2374	<i>Muræna sanctæhelenæ</i> , Günther.
Family SYNAPHOBRANCHIDÆ.		
	2328	<i>Synaphobranchus pinnatus</i> , Günther.
Family SIMENCHELYIDÆ.		
	2327	<i>Simenchelys parasiticus</i> , Gill. <i>Prig-nosed Eel</i> .
<b>SUB-CLASS Ganoidei.</b>		
<b>SUPER-ORDER HYOGANOIDEI.</b>		
<b>ORDER Cycloganoidei.</b>		
Family AMIIDÆ.		
	1803	<i>Amia calva</i> , Linn. <i>Bow-fish; Dog-fish; Mud-fish</i> .
<b>ORDER Rhomboganoidei.</b>		
Family LEPIDOSTEIDÆ.		
565	62	<i>Lepidosteus osseus</i> (Lac.), Ag. <i>Common Garfish</i> .
566	1823	
	2504	
	1827	<i>Litholepis platystomus</i> (Lac.), Jordan. <i>Short-nosed Gar Pike</i>
<b>SUPER-ORDER BRANCHIOGANOIDEI.</b>		
<b>ORDER Crossopterygia.</b>		
Family POLYPTERIDÆ.		
	2505	<i>Polypterus bichir</i> , Auct.
	2528	
<b>SUPER-ORDER DIPNOI.</b>		
<b>ORDER Sirenoidei.</b>		
Family CERATODONTIDÆ.		
	2480	<i>Ceratodus forsteri</i> .

Crem.	Skel.	
SUPER-ORDER <b>CHONDROGANOIDÆ.</b>		
ORDER <b>Chondrostei.</b>		
FAMILY ACIPENSERIDÆ.		
1152 1864	961	<i>Acipenser oxyrhynchus</i> , Mitch. <i>Sharp-nosed Sturgeon.</i>
	2342	<i>Acipenser sturio</i> , Linn. <i>Sturgeon.</i>
	1819	<i>Scaphirhynchops platyrhynchus</i> (Raf.), Cope. <i>Shovel-nosed Sturgeon.</i>
ORDER <b>Selachostomi.</b>		
FAMILY POLYODONITIDÆ: <i>Spoon-billed Cats.</i>		
1808	1577	<i>Polyodon folium</i> , Lac.
SUB-CLASS <b>Elasmobranchii.</b>		
SUPER-ORDER <b>HOLOCEPHALI.</b>		
FAMILY CHIMÆRIDÆ.		
2377		<i>Chimæra plumbea</i> , Gill. <i>Brown Chimera.</i>
SUPER-ORDER <b>PLAGIOSTOMI.</b>		
ORDER <b>Raiaæ.</b>		
SUB-ORDER <b>MASTICURA.</b>		
FAMILY TRYGONIDÆ.		
1165	1174 1588	<i>Trygon centrura</i> (Mitch.), Gill. <i>Sting Ray; Stingaree.</i>
SUB-ORDER <b>PACHYURA.</b>		
FAMILY RAIAIDÆ.		
	874	<i>Raia undulata</i> , Lacep. <i>Whip-tailed Ray.</i>
	1159	<i>Raia laevis</i> , Mitch. <i>Sharp-nosed Skate.</i>
2383		<i>Raia erinacea</i> , Mitch. <i>Clear-nosed Skate.</i>
2384	2379	<i>Raia radiata.</i> <i>Donovan Skate.</i>
	2449	<i>Raia stellulata</i> , Jor. and Gill.
ORDER <b>Squali.</b>		
FAMILY SPINACIDÆ.		
	1155 1826	<i>Squalus americanus</i> (Storer), Gill. <i>Dog-fish; Dog Shark.</i>
	2395	<i>Centrophorus cœlolepis</i> , Günther.

Cran.	Skel.	
Family GALEORHINIDÆ.		
673	1878	Eulamia milbertii (Müll. and Henle), Gill. <i>Blue Shark.</i>
1172 1262		Eulamia obscurus (Lesueur), Gill. <i>Dusty Shark.</i>
1052		Galeocerdo tigrinus, Müll. and Henle. <i>Tiger Shark.</i>
1167	1818	Mustela canis (Mitch.), De Kay. <i>Smooth Dog-fish.</i>
Family SPHYRNIDÆ.		
	2343	Sphyrna zygaena (Linn.), Müll. and Henle. <i>Hammer-headed Shark; Cornida; Magnosa.</i>
Family CARCHARIDÆ.		
1171	1166	Eugomphodus littoralis, Gill. <i>Sand Shark; Shovel-nose.</i>
Family HETERODONTIDÆ.		
	2506	Cestracion philippi.
	2436	Heterodontus francisci (Grd.), Gill.







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